

# THE CANADIAN ARCHITECT AND BUILDER

VOL. XIX.—No. 1.

TORONTO, MONTREAL — JANUARY, 1906 — WINNIPEG, VANCOUVER

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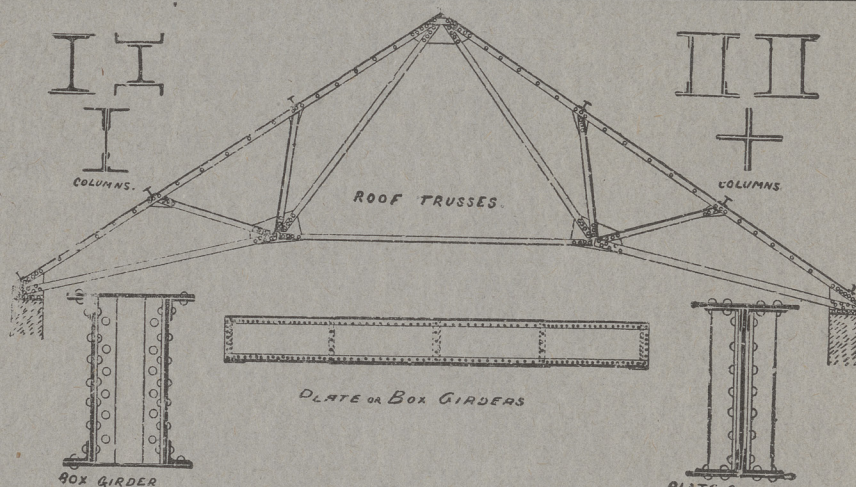
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## INDEX TO ADVERTISEMENTS

**Architects.**  
Ontario Directory... III  
Quebec Directory... III

**Architectural Sculptors.**  
Adamson & Wicks. III  
Holbrook & Mollington... I  
McCormack & Carroll... xii

**Architectural Iron Work.**  
Canada Foundry Co. xiv  
Dominion Bridge Co. I  
Locomotive & Machine Co. vii

**Bells.**  
Gillett & Johnston iii

**Blue Print Paper.**  
Electric Blue Print Co. x

**Bridges.**  
Canadian Bridge Co. ix  
Dominion Bridge Co. I

**Builders' Supplies.**  
Bird & Son, F. W. xv  
Luxfer Prism Co. xii  
Montreal Directory xvi  
Morrison, T. A. xvi  
Ontario Lime Association... xvi  
Rhodes, Curry & Co. IV  
Toronto Directory. xvi

**Building Stone Dealers.**  
Amherst Red Stone Quarry Co. vi  
Credit Forks Stone Co. vi  
Brodie, Jas. vi  
Doolittle & Wilcox... iv  
Hood & Son... vi  
Hagersville Contracting Co. vi  
Horse Shoe Quarry. vi  
Kline, John. vi  
Myers, Oakley. vi  
Niagara Quarry Co. vi  
Roman Stone Co. vi  
Sackville Freestone Co. vi  
Spanner, O. vi

**Builders' Hardware.**  
Brooks-Smith Hardware... IV  
Canadian Iron & Hardware Co. ix  
Vokes Hardware Co. iv

**Bricks.**  
American Enameled Brick & Tile Co. I  
Beamsville Brick & Terra Cotta Co. II  
Don Valley Brick Works... 16  
Port Credit Pressed Brick Co. xi

**Cement Brick Machine.**  
London Cement Brick Machine xi

**Cements.**  
National Portland Cement Co. ix  
The Kanban Co. IV

**Cement Block Machines.**  
Reinforced Concrete Company... iv

**Creosote Stains.**  
Cabot, Samuel... I

**Drawing Inks.**  
Wagner, Gunther... \*

**Elevators.**  
Otis-Fensom Elevator Co. I  
Parkin Elevator Co. I  
Furnball & Russell Co. viii

**Engravers.**  
Alexander Engraving Co. v

**Engineers.**  
A. W. Connor... xvi  
Canadian White Co. IV

**Folding Partitions.**  
Springer, O. T. II

**Grilles and Railings.**  
Dennis Wire & Iron Co. viii

**Granite.**  
Brunet, Jos. vi  
McIntosh-Gullett Co. vi

**Hardwood Flooring.**  
Seaman, Kent & Co. xi

**Heating.**  
Sheldon & Sheldon II  
Gurney Foundry Co. xv

**Interior Decoration.**  
Elliott & Son Co. viii  
McCormack & Carroll... xi

**Lime.**  
Ontario Lime Association... xvi

**Mail Chutes.**  
The Cutler Mfg. Co. x

**Mantels, Grates, and Tiles.**  
Brooks-Smith Hardware... IV  
Holbrook & Mollington I

**Mortar Colors and Shingle Stains.**  
Cabot, Samuel... I

**Office Furniture.**  
Canadian Office & School Furniture Co. xv

**Ornamental Iron Work.**  
Canada Foundry Co. xiv  
Dennis Wire & Iron Co. viii

**Ornamental Plaster Decorators.**  
Hynes, W. J. III

**Painters.**  
Montreal Directory xvi  
Toronto Directory. xvi

**Prisms.**  
Hobbs Mfg. Co. v  
Toronto Plate Glass Co. viii

**Paints & Varnishes.**  
Berry Bros. xiii  
Canada Paint Co. xii  
O'So-Ezy Mfg. Co. xiii

**Parquetry Floors.**  
Elliott & Son Co. viii

**Plate Glass.**  
Consolidated Plate Glass Co. ix  
Toronto Plate Glass Importing Co. viii

**Plumbers.**  
Montreal Directory xvi  
Toronto Directory. xvi

**Roofers.**  
Duthie & Sons, G. xvi  
Douglas Bros. xvi  
Forbes Roofing Co. xvi  
Nicholson & Co. xvi  
Rennie & Son, R. xvi  
Ormsby & Co., A. B. I  
Ringham, George. xvi  
Williams & Co., H. xvi

**Rubber Tiling.**  
Gutta Percha Rubber Co. xiii

**Reflectors.**  
Frink, J. P. III

**Roofing Material.**  
Bird & Son, F. W. xv  
Galt Art Metal Co. 15  
Ormsby Limited, A. B. I  
Roofers Supply Co. II  
The Pedlar People x

**Sash Cord.**  
Samson Cordage Works. ii

**Stained and Decorative Glass.**  
Horwood & Sons, E. xiii  
McKenzie Stained Glass Co. xi  
St. George, H. E. i

**Sanitary Supplies.**  
Natuso Co. vii  
Standard Ideal Sanitary Co. ii

**Shingles and Siding.**  
Ormsby & Co., A. B. I  
Roofers Supply Co. II

**Soil Pipe.**  
Toronto Foundry Co. II

**Sheathing and Deafening Material.**  
Bird & Son, F. W. xv  
Cabot, Samuel... I

**Tubing and Fittings.**  
Conduits Company xiii

**Tiles.**  
American Enameled Brick & Tile Co. I  
Craven, Dunhill & Co. I  
Ellacott, J. A. T. xvi  
Gutta Percha Rubber Co. xiii  
Holbrook & Mollington I  
Permanent Decorative Glass Co. ii  
Robinson & Rowell x  
Toronto Plate Glass Co. viii

**Typewriters.**  
Canadian Typewriter Co. ....

**School and Church Furniture.**  
Globe Furniture Company... xviii  
Can. Office & School Furniture Co. xv

**Vaults.**  
Taylor, J. & J. x

**Wall Plaster.**  
Albert Mfg. Co. II  
Imperial Plaster Co. 15

**Weather Strip.**  
Chamberlain Metal Weather Strip Co. x

**Window Cord.**  
Samson Cordage Works... I

**Waterproofing for Brickwork.**  
Cabot, Samuel... I

**Wire Talk.**  
B. Greening Wire Co. xvi

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## A FULL ACCOUNT OF THE CONCRETE DAM TIPPED IN THE NIAGARA RIVER.

One of the most unique engineering feats of recent years is that which Isham Randolph, consulting engineer of Chicago, has just completed at Niagara Falls. The Canadian city of Niagara Falls which operates its own water works has had difficulty in getting enough water at its intake to supply the pumps. This intake is in Victoria Park where the power development plant is being constructed.

The Niagara Falls Park & River Railway Co., which develops its own power and obtains its water through the same intake, complained that it was losing the volume of water necessary for its power. The park commissioners admitted the loss of water and looking for a remedy consulted Mr. Randolph. The engineer suggested two plans, one was to lower the bed of the intake, but this on investigation proved impracticable, while the other which was carried out, was to erect a concrete column on the shore of the river and when completed tip it over into the river so as to form a dam.

The concrete column was built on a trestle twenty feet high, the column itself was 50 feet in height and 7 1-3 feet square. It was constructed in six foot sections held together by a chain running through the centre. Several links were left loose between each section and between the sections were placed wooden wedges twelve inches thick on the outside tapering to six inches toward the centre of the column. When the falling column struck the rocky bed of the river it broke into eight sections at these points. The heavy chain used held the six foot sections together and prevented them being separated and carried away by the rush of water. The column was tipped by raising the inside of the trestle with jacks; in a little over half an hour the column fell exactly as had been planned.

At this point the course of the river sends the water

whirling against the shore. The fallen dam made a pocket, as it were and the river in flowing around this obstruction was backed up, causing a rise of about ten inches at the intake. This proved the practical solution of the problem.

The concrete dam in falling into place struck an unobserved boulder in the bed of the river causing about seven inches of one section to show above the surface of the water, this exposed section has caused some unfavorable comment from a scenic standpoint.

At the present time there are in operation and being constructed on both sides of the river, electrical power plants, whose combined horse power is more than 500,000. This means that soon the water pouring over the natural falls will be reduced 12 per cent. in volume. One-eighth of the total flow out of Lake Erie will never reach the natural falls, but will be diverted through a hundred artificial channels blasted out of solid rock. It is imperative that action be taken to prevent a further reduction of the water of Niagara Falls.—*Concrete.*

No one can be sure of the exact limits of his own ability. He can limit it himself by not putting it forth, but he cannot tell how far it would extend by steady and persevering exercise. Many of those who have distinguished themselves have been men of very moderate capacity, who have developed it by assiduous effort.

It is not unusual to hear people lamenting that they cannot accomplish what they desire, that they cannot compete with others in this or that undertaking, that they can never become eminent or great in any direction, they regard this as a calamity, and sometimes use it as an excuse for not exerting the powers they do possess to the utmost.

The Pedlar Company, of Oshawa, Ont., have issued this month two very complete catalogues numbers 14r and 14c. which contains illustrated descriptions and prices of their extensive lines of sheet metal building materials. This company now have warehouses and carry stocks in every province of the Dominion and also in Capetown, South Africa, Sydney, Australia and Auckland, New Zealand.

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## ENGINEERING JUDGMENT.

Captain Eads was once asked why he was so positive that the assertions of several eminent scientists concerning the condition of a river bed were erroneous, since these specialists were willing to stake their reputations on the truth of their claims. He answered that he could not understand the theories and did not have the time to hunt for their mistakes, but was sure about the river bed because he had examined a considerable part of it in a diving bell. Such, at least, is the story that is told of him, and it is worth mentioning here because it shows the great difference between science and judgment in matters of civil engineering.

—*Engineering Record.*

## AIR MOISTENERS FOR FURNACES.

There has long been a demand for a practical apparatus for supplying moisture to artificially heated buildings, and there has at last been invented a practical vaporizing apparatus to accomplish this purpose. It is arranged to be placed in the centre of the bonnet or top of the hot air furnace. The portion of the vaporizer below the main dome lies within the air chamber at the top of the furnace so that the series of small circular openings in the vaporizer may permit the vapor to moisten the air as it passes by it. The vaporizer consists of a small boiler automatically supplied with the water required, the water supply being controlled by means of a valve operated by a lever attached to a

piston connecting with a float in water chamber. When the water level has reached a given point, the float rises and closes the valve. When a sufficient quantity of water has passed through the hot air chamber, the float lowers, opens the valve and the water enters the vaporizer through the supply pipe.—*Hardware and Metal.*

## CANADIAN SOCIETY FOR PRESERVATION OF NATURAL BEAUTY.

In St. Catharines, Ont., on October 30, a society was organized for the protection of Canadian beauty spots from disfigurement by advertising signs and nuisances of a like character, with the following officers: President, Rev. G. H. Smith, D.D.; Vice-President, John Henderson, B.A.; Secretary, R. Sutherland; Treasurer, Alexander McLaren; Executive Committee, Rev. Dean Ker, R.W. Dillon and Capt. A. H. Malcolmson. The name of the society is the Canadian Scenic and Historical Preservation League. Local improvement work will be taken up in addition to the advertising sign nuisance. It is intended to organize branches of the league in all important cities and towns in Canada.

Canadian District Heating Co., Hamilton, share capital \$250,000, purpose to produce natural gas, electricity, steam and hot water for lighting and heating purposes. The directors are:—W. W. Stewart, W. J. Clark, R. B. Griffith and W. P. Witton, all of Hamilton, and J. H. Williamson, of Toronto.

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The Publishers of "The Canadian Architect and Builder" have arranged to furnish information respecting British Exporters of Building Materials and their goods advertised in this paper, and will keep on file at their offices, Alliance Building, Montreal, Confederation Life Building, Toronto, and 720-721 Union Bank Building, Winnipeg, Catalogues, Price Lists, Etc.

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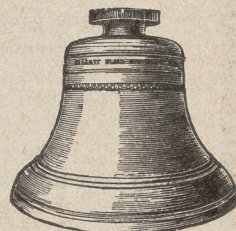
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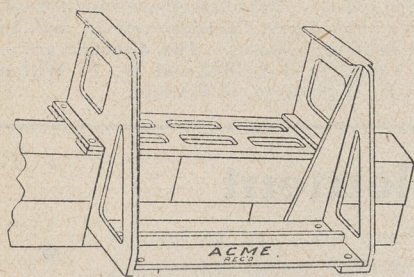
The chief dimensions of the chimney are as follows : height, 307 feet 6¾ inches; foundation, 6½ feet deep, 39½ feet square; inside diameter of chimney, 18 feet; largest outside diameter, 21 feet. To a height of 90 feet it is built double, the outer shell being 9 inches thick and the inner 4 inches thick, with a 5 inch air space between the two shells. The single shell is 7 inches thick and 211 feet ¾ inch high.

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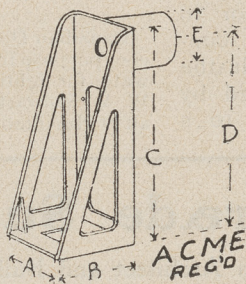
1¼ x 3/16 inches and the chimney part is reinforced by vertical T bars of the same dimensions ranging from 16 to 30 feet in length, and encircled by rings of T steel. All the work was done from the inside of the chimney, a scaffold being raised as the work progressed. Material was hoisted by means of a cable attached to the drum of the engine operating the concrete mixer. After the foundation was in, the construction occupied just fifty working days. The chimney cost \$27,600. In its construction 1,225 barrels of cement and 105,000 pounds of T steel were used.

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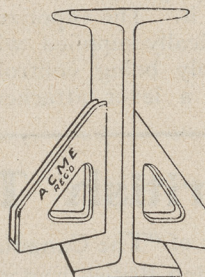
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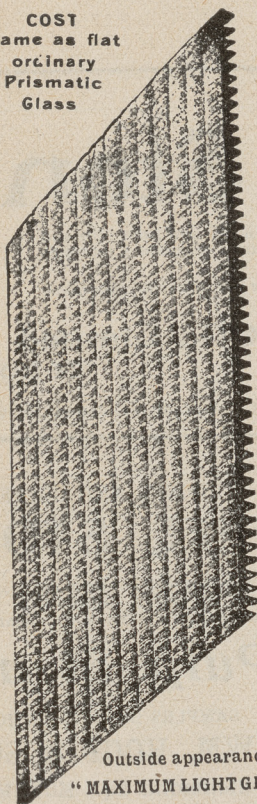
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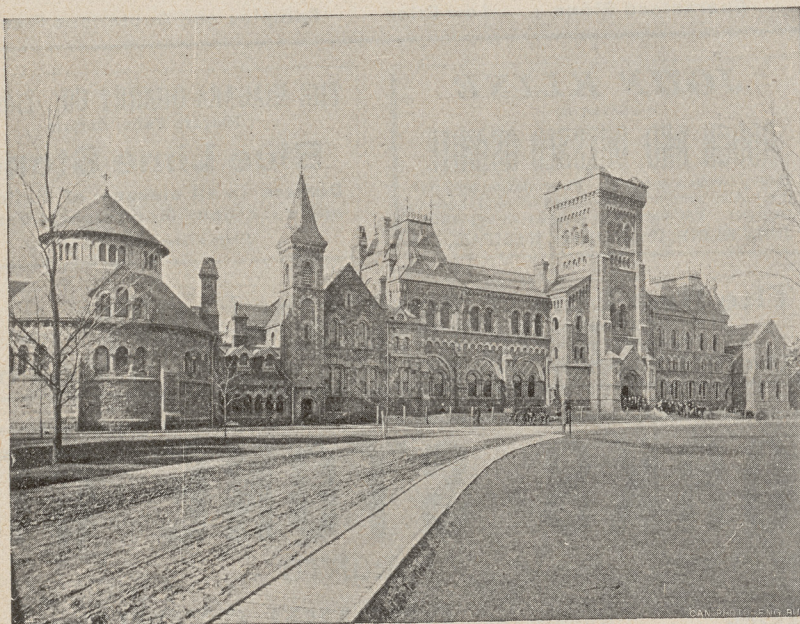
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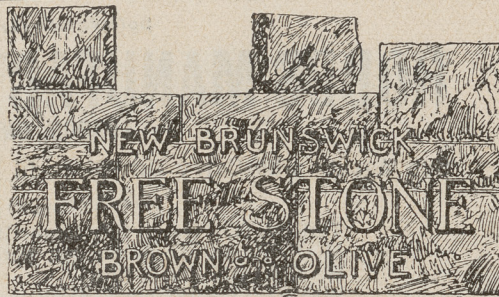
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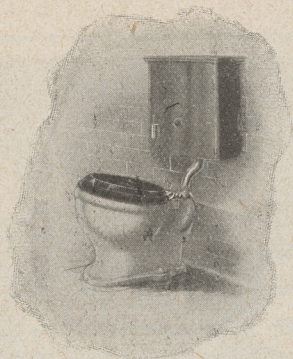
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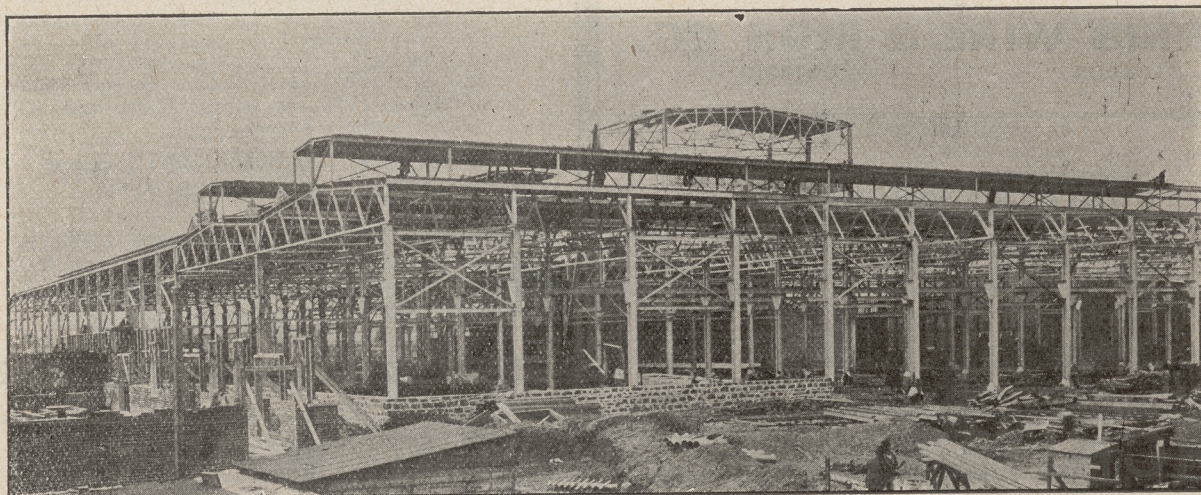
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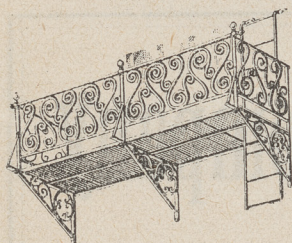
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C. H. MORTIMER PUBLISHING COMPANY

PUBLISHERS.

W. A. LANGTON

EDITOR.

OFFICES: CONFEDERATION LIFE BUILDING, TORONTO, CANADA.

VOL. XIX.—NO. 217.

JANUARY, 1906.

## ILLUSTRATIONS ON SHEETS.

The Traders Bank of Canada Building, Toronto.—Messrs. Carrère & Hastings, New York and Mr. F. S. Baker, F.R.I.B.A., Toronto, Associated Architects. View of Structural Steel Work from a Photograph—Perspective of Completed Building.  
Entrance to No. 30 St. James St., Montreal.

## ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

View of construction of new Central Avenue, Rio Janeiro.  
Commercial Building on the new Central Avenue, Rio Janeiro.

## CONTENTS

Editorial	1-2	The Billboard Malady	16
Permanent Art Commissions	3	A Full Account of the Concrete Dam Tipped in the	
British Fire Prevention Test, A Cement Concrete Floor	4	Niagara River	ii
Our Illustrations	5	Engineering Judgment	iii
Proceedings of the Ontario Association of Architects		Air Moisteners for Furnaces	iii
Annual Convention	6-10	Canadian Society for Preservation of Natural Beauty	iii
Intercommunication	11-12	Concrete Chimney 307½ Feet High	iv
Montreal Notes	13	Fireproof Test	ix
The Province of Quebec Association of Architects	14	The Good Manners of a Good Neighborhood	x
Architectural Acoustics	14	A Dream in Architecture	xi
The P.Q.A.A. Sketch Club	15	Canadian Rough Casting	xii-xiii
Moving a Block of Houses	15	The Union Oath	xiv
Knot for Tying Sash Cords	15	The C.P.R. Architect	xv

## CHANGE OF ADDRESS.

After the 1st of February the Vancouver office of this paper will be located in the new Davis Chambers Building on Hastings street, near the corner of Granville street, where more commodious quarters have been secured, and where our representative will be pleased to meet the friends of the paper.

### The Cathedral Builders.

At last some one who writes with the authority of learning has arisen to say what we have all known to be true though we had no standing against those who write books to the contrary. Mr. Edward S. Prior, in a book called *The Cathedral Builders* in England quietly snuffs out the idea that the cathedrals were the work of a guild. The idea appears to have originated or at any rate received its authority from Lord Macaulay who, in a conversation reported by Mrs. Beecher Stowe, said: "I believe that all the cathedrals of Europe came into existence nearly contemporaneously, and were built by travelling companies of masons under the direction of a systematic organization." The chronological study of Gothic architecture was in its infancy in Macaulay's day and he probably knew less about it than our students do now—so much is the greatest mind limited by its age. The theory of the Freemason guild is interesting as showing how the mind of the historian works over the vestiges of the past; but we also see how essential to its working are the scientific burrowings of specialists in search of mere facts. It is the suspicious absence of facts referring to the Freemason's guild that has given us, when reading about them, the uneasy feeling that ends in skimming. Mr. Prior turns suspicion to conviction. "This guild," he says, "if it existed, must also have had a supernatural power of hiding its tracks, for in all our accounts and records are no references which can be twisted into a consciousness of a Freemason guild. Instead of indicating a central body of masoncraft to which ecclesiastics applied for the build-

ing of their churches, they mention artisans coming haphazardly together, and their organization for the special work, as at Canterbury, or in the case of continuous building in one of our large cathedrals, we have the establishment of a cathedral bureau—'opus' or 'opera' as it was called—such as at York, which has indeed practically continued to our own day."

### Architectural Refinements.

The review of Mr. Prior's book in *The Builder*, from which we get the above extract and the quotation from Lord Macaulay, gives another extract which is a valuable contribution to the discussion as to the existence of optical refinements in the architecture of the middle ages which has been raised in England by the appearance in Edinburgh of Professor Goodyear and his exhibition of photographic views of irregularities in mediæval buildings. Professor Goodyear's articles are generally known here. As they came out in the *Architectural Record* we read them, at first with excitement, then with a gradually waning interest as we saw that, though irregularity was being found everywhere, there seemed to be no system in it, and the author seemed to prove too much intention to be true. Mr. Prior says: "I have never found any system of æsthetic creation in the proportions of mediæval building beyond the simplest promptings of the square and the compass. The curvings of walls and the irregular spacings of supports can be seen to be one of two things, either the immediate habit of craftsmanship or the result of expediency—both varied by the difficulty of building piecemeal and to suit existing buildings, difficulties that were the constant necessities of church-work in the Middle Ages."

### The Sliding Scale Unjust.

Mr. Cass Gilbert, the architect of the Minnesota State Capitol, has proved by experience, as appears from a letter of his addressed to the editor of *The Western Architect*, that the sliding scale of fees



works injustice to the architect. Mr. Gilbert's first contract with the Board in charge of the building operations was for a proposed cost of \$1,500,000 on a sliding scale which averaged 4 per cent. When the appropriation was increased the fee for the remainder according to the sliding scale would have been 2 per cent.; but, as he had already sufficiently proved that the expenses of his office were considerably in excess of this he protested, or more properly speaking resumed a protest that he had made from the first, against the diminution of the scale of fee to 2 per cent. He argues that "if the first portion of the work is worth 5 per cent., the last portion, which is always the most elaborate, cannot be performed for 2 per cent." The Board saw the essential fairness of his position and wrote a new contract with him, extending the old contract upon the basis of 5 per cent. for all work above the \$1,500,000. The Board's action was made the subject of investigation by a committee of the House of Representatives and was sustained by the House. Mr. Gilbert says that much of the 5 per cent. work was done at a loss, even at that figure. His opinion is that "no matter how large the work may be, if it is at all enriched in detail and finish, 5 per cent. is a small compensation, although it may look large in bulk when taken by itself," without considering the work done. He suggests that we should "compare it with the compensation paid to real estate men for the buying and selling of land" and "compare the amount of the work in each case." Mr. Gilbert's letter was written originally not for publication but to correct an understatement of the amount of his fee that appeared in *The Western Architect*, and to suggest to the editor that he should advocate a 5 per cent. minimum, so as to prevent other Boards from making the mistake of attempting to employ architects on the sliding scale basis. The action of the Minnesota Capitol Board and its support by the Legislative Investigation Committee, are strong evidence against the reasonableness of the sliding scale system.

Whatever may be the case in **Signing Architecture**, the old world, which gives a thought too much regard to graphic artists, in this country, in fact on this continent, the architect is the leading figure. The names of prominent architects are well known, not in their own city only but throughout their own country and beyond it. It is questionable whether any architect in the history of the world has ever been so widely known, in his own generation, to a general public, as is, at the present moment, Mr. Daniel H. Burnham. This is partly due to the widening of the architects' sphere, and in Mr. Burnham's case, to a celebrity gained by his successful conduct of the building operations of the Chicago Exhibition, continued by his connection with the Washington improvements project, and by the frequency with which he is applied to now for advice by cities that are devising improvements in their plan. But while these large dealings naturally attract attention, so that the newspapers mention Mr. Burnham's name with the same simplicity as they would a general's, in full confidence that every one will know who he is, there are architects who are not architects of cities, but only of buildings, who are almost, if not quite, equally well known. Building is in fact going large now-a-days; a single structure

may be an important addition to any city, and this importance naturally gives the architect a new interest for the public. The interest spreads to the smaller designers, partly as members of the same profession but partly for another reason—the new importance that is attached by the mass of the people to their houses, since it has become as easy to own as to rent. Indeed in some places in Canada it is more easy to own than to rent; for speculative builders build only to sell and will not rent. This state of affairs has brought about a widely spread domestic sentiment which is acting as a wholesome counteragent to the idea that life in a flat, without housekeeping or other responsibilities, is the American woman's due. The use in the United States of the pregnant word "home" instead of the simple word "house", irritating as it is when used on all occasions, marks how this sentiment has grown and how, (which is our present object in noting it), the interest taken in small houses has become attached to their architects.

Even the press is not without signs of abandoning its tradition of ignoring the architect in its notice of buildings. The editors of the daily papers are still as sensitive to a "free ad." as they are to a typographical error, yet the names of the architects of projected buildings are always mentioned under the cuts of the buildings which are so frequently inserted now in the newspapers.

This growing interest in architects is a mark of awakening recognition that architecture is an art. This—it being the truth—it is a good thing to have recognized. It is to the advantage of everybody that the recognition should be furthered in every possible way; and one way which has been frequently proposed, is that architects should sign their buildings. In speaking of it recently, in a presidential address to the Architectural Association, Mr. Guy Dawber said that the signature of buildings is a custom on the Continent. That it is not unknown in England may be seen on the terra-cotta face of an hotel building in Piccadilly, where the signature of Messrs. Ernest George and Peto, architects, appears as a conspicuous corner decoration. When one sees a signature, placed thus in a prominent position, one becomes seriously aware that it does not make for benefit to the architect unless he has done well. The proceeding clearly has a double side—both working for good: that the art of architecture should be exalted in the eyes of the public and that the architect's sense of responsibility should be kept alert. When an architect did his work under a cloud of oblivion; paired off with the plumber in building operations, as equally undesirable and only not so necessary; it required stout and enduring character and conscience not sometimes to sink into a state of indifference and compromise. It is hard to uphold the fine thing against its neglect. It is hard to uphold an art alone. Indeed—as art that is alive always gets its living quality by expressing the life of its time, and only pedantry or eccentricity comes from the secluded artist—the more the architect is in touch with the world the better for his art.

The growing interest in architecture and architects is wholesome, and if it is assisted by a movement towards signing buildings it will be a good thing. It is quite likely that no formal assistance will be needed to such a movement, but that a custom so much in accordance with the general feeling of this time of Renaissance will arise, as customs do arise, all at once, everybody apparently following everybody else.



## PERMANENT ART COMMISSIONS.

It will be observed that the address of the President of the Royal Institute of British Architects, part of which was reprinted in our last issue entered very seriously, and at greater length than in any other part of his remarks, into the question of the improvement of London. The President of the Society of Architects, whose address is reported in the English architectural journals, placed equal weight upon this question. The last meetings of the Architectural League of America and of the American Institute of Architects had papers upon the subject; and the policy of planning improvements to Washington was the theme of Mr. Roosevelt's remarks at the Institute dinner. The annual meeting of the Ontario Association of Architects last year had, in the same manner, two important papers upon the subject of city improving, and a committee formed by that body has since made a plan for The Toronto Guild of Civic Art which will now become the property of the Guild and it is hoped will before long be the property and working plan of the city of Toronto. There is nothing solitary about this effort. However original may have been the impulse that led to it, the effort is only part of a general movement on this continent. We have heard a great deal of the Cleveland Architectural Club's work in accomplishing the celebrated "group plan"; and, under whatever influence, other cities are deep in the same work—Buffalo, St. Louis, Philadelphia, Baltimore, New Orleans, St. Paul, Minneapolis and Chicago, not to speak of Boston and New York which have got past the stage of spasmodic effort and entered to some extent upon the sort of methodical process which it is the purpose of this article to advocate.

If there is one thing of which we can speak confidently as a contribution of our own century to the history of art, it is this—the popular desire to beautify cities. Earlier generations built beautiful buildings or groups of buildings, and made spaces for beauty here and there. Nobles and kings had wealth and power that enabled them to make beauty conspicuous in a city, but the city itself was not the object of their effort. Now it is different. As the individual lessens and the community grows more conscious of its existence as a whole, we are not satisfied with perfection in buildings here and there and squalor between, but want the whole town to be as much as possible a pleasant place to live in.

This first took the form of sanitation, to which we are now so accustomed that we hardly realize it to have been the work of the last century.

We read of London gentlemen, in the time of the Stuarts and later, being dressed in silk and velvet trimmed with lace, and we look at our own sober tweeds and think the world is not what it was. That is true but in another way. The gentlemen in silk and lace walked close to the walls of the houses as they passed along the street, for fear of being splashed, by a passing horseman, with the liquid mud of the roadway. We are practically unacquainted with mud. We have a little dust and grumble much about it; but our grumbling cannot compare with that of Charles II, who declined to drive to the city because the wheels of his coach stirred up such a stench from the roadway. If this was the condition of main avenues, the site of palaces and great churches, what must have been the state of by-ways and alleys where, as Macaulay has

said, "men died as fast then in the towns of England as they do now on the coast of Guinea."

All this—after centuries of indifference to it, founded on ignorance—disappeared under the influence of advancing science; and London's 300 miles of streets have, by the force of one impulse, been all drained, paved, and piped for gas and water.

Our generation has been born to this state of affairs and expects nothing less, but, just like our forefathers before the days of sanitation, we have expected nothing more. That anything at all resembling the immense sums that have been spent in making cities comfortable to live in should be spent in making them beautiful startles us. Events however are familiarizing us with the idea. It is not so strange to the public mind as it was a few years ago. But it has not yet become part of the matter of municipal politics. There must have been something of the same halting start in the beginnings of sanitation. But, though the expense of draining a whole city or laying on water to every house must have at first appalled, the conviction of its necessity soon found a method for its accomplishment.

It is method we want in the matter of beautifying cities. Conviction is gaining strength continually but we have no method. It seems to have been generally supposed that this was a matter for individual effort; that those who like beauty should promote its attainment and procure the means for it. That did very well to start with; when the state of the public mind in regard to the matter was not known; but the state of the public mind is quite clear now. There are not only a number of societies in the cities formed to promote "civic art"—we have a name for it now—but bodies formed for other purposes altogether send delegates to the civic art societies and pass resolutions at their own business meetings in support of projects for beautifying their town. The public in general is thoroughly aroused upon the subject, and all those who stand in the place of guides and guardians for the public back up the movement as a step essential to advance.

Then, if we all want to have our cities add to their other comforts the supreme comfort of beauty, why should we not get on with the work? It only wants method. For the mere want of method the present generation may go on all its life, wanting and not having; while satisfaction—not all at once perhaps but continually increasing—is within its reach for the expenditure of a moderate sum per annum.

The amount per annum to be spent may in time perhaps be settled as bearing some fixed relation to the rate of taxation for general purposes, but at first it will be easier to settle upon a round sum.

This has been done for the city of Ottawa by the Dominion Government, and the progress that is made in the beautification of the capital by means of a yearly grant may be taken as an object lesson for the other cities of the Dominion. For Ottawa \$60,000 per annum was considered a proper amount. Therefore in proposing a sum of \$50,000 per annum for cities like Montreal or Toronto—or Winnipeg, which is growing rapidly and would do well to grow wisely—we are proposing what may be truly called a moderate sum.

Yet how much could be done with the certainty of such a sum being available every year. It means a quarter of a million in five years. With that behind



them its administrators could borrow and go on with some considerable work. It would not be necessarily all expenditure. Some improvements make returns; and, under good management, the power to use a considerable sum would sometimes produce results commensurate, from a financial standpoint only, with the expenditure involved.

Such management would have to be independent of the municipal election system. It should be a permanent commission, perpetuated by appointment; able to carry out a continuous policy and acquire skill from experience. Under these circumstances we could find men of standing who would be willing to serve as commissioners, for the work would be worth doing.

### BRITISH FIRE PREVENTION COMMITTEE TEST, A CEMENT CONCRETE FLOOR.

This test was made to enable some decision to be made as to the peculiarities in behavior and the comparative reliability of aggregates for concrete floors intended to be fire-resisting.

A brick testing hut was built, measuring 10 ft. 2 in. by 53 ft. 4 in. internally. This was covered in at a height of 8 ft. 3 in. above the pavement of the hut with the floor construction which was to be tested.

The floor was divided into seven bays by six steel I beams, measuring 6 in. by  $4\frac{1}{2}$  in. and weighing 20 lb. per foot. The ends of the beams were built into the side walls of the hut, 1 in. clear space being left at the ends of each joist. Each joist was encased with coke breeze concrete, 9 in. wide by  $10\frac{3}{4}$  in. deep, so as to give a minimum of 2 in. of concrete all round the joist.

The seven bays thus made each measuring 10 ft. 2 in. long by 2 ft. 7 in. wide between the concrete casing of the beams, were filled in by slabs of concrete  $5\frac{1}{2}$  in. which were quite separate, resting on a  $4\frac{1}{2}$  in. set off all round the walls of the hut and on the concrete casing to the girders. The slabs were not fixed on the girders; and their edges were free all round from contact with the walls and each other, by a space equal to the thickness of the wood strips which enclosed them when being made.

The different concretes were made in the same manner. The material was turned both in its dry and wet condition, and the concrete to form each slab was laid on the centering in a rather wet state. 1. 2 gallons of water were used for each cubic foot of concrete, approximately 20 per cent. of water by volume.

The cement used was the same for each slab, viz. Portland; a London make called "Ferrocete"; ground very fine so that there was only a 14 per cent. residue on a sieve with 32,400 meshes to the square inch; of great tensile strength, and expansion not exceeding 2 m.m. under the Chatelier test.

The sand when it was used was also the same for each case viz. clean pit sand.

The aggregates used and proportions of material for the seven bays were as follows:—

		Parts by volume.
I SLAG CONCRETE	Blast furnace slag	3
	Sand	2
	Cement	1
II BROKEN BRICK CONCRETE	Broken brick	3
	Sand	2
	Cement	1
III GRANITE CONCRETE	Broken granite	3
	Sand	2
	Cement	1

IV BURNT BALLAST CONCRETE	Burnt ballast	5
	Cement	1
V COKE BREEZE CONCRETE	Coke breeze	5
	Cement	1
VI CLINKER CONCRETE	Furnace clinkers	3
	Sand	2
	Cement	1
VII THAMES BALLAST CONCRETE	Thames Ballast	3
	Sand	2
	Cement	1

When the work was completed the hut was covered with tarpaulins. The centering was removed 14 days after the slabs were formed. After five days, the coke breeze casing to the beams was rendered with plaster,  $\frac{1}{4}$  in. thick. After 9 days, each separate bay was loaded with bricks equal to a distributed load of 224 lb. per ft. super. A month after completion a coke burner was kept alight in the testing chamber for seven days. On the following day the covering was removed from the roof and the test was made.

The test consisted of the application of heat by means of gas for a period of three hours, reaching 900° Fahr. in the first 5 minutes and continuing to rise during the rest of the time until, about the close of the test, a temperature of 1920° was reached at the hottest spot.

After the first ten minutes the plastering began to fall off the beams, and continued to fall in patches throughout the test, but nothing noticeable occurred to the beams. When, at the close of the test, water was applied for three minutes, more plaster was washed off the beams but nothing further could be observed.

During the test it was seen from above that the edges of slabs Nos. I, VI and VII, where they could be seen in the space between their ends and the wall, were red hot.

On the next day the bricks forming the load were removed. Observations of the under side were made on that day and of the top two days later. The observations were as follows:—

#### BAY NO. I. SLAG CONCRETE.

SOFFIT. Practically flat. Slight cracks corresponding to those on top.

TOP. Cracked across into about three equal parts, curved downwards about  $\frac{1}{4}$  in.

#### BAY NO. II. BROKEN BRICK CONCRETE.

SOFFIT. Curved downwards  $\frac{1}{4}$  in. Slight cracks corresponding to those on top.

TOP. Cracked across into four unequal parts. Very slight curve downwards.

#### BAY NO. III. GRANITE CONCRETE.

SOFFIT. Curved downwards  $\frac{1}{2}$  in. About 1 in. washed off the surface in one part and the surface slightly washed off over the area struck by the water.

TOP. Slab cracked across into four parts; curved downwards about  $\frac{1}{2}$  in.

#### BAY NO. IV. BURNT BALLAST CONCRETE.

SOFFIT. Roughly curved downwards about  $\frac{1}{4}$  in. About 3 in. in depth washed off the surface in one part.

TOP. No cracks—not curved.

#### BAY NO. V. COKE BREEZE CONCRETE.

SOFFIT. Flat. About 1 in. washed off the surface all over where struck by the water.

TOP. No cracks—not curved.

#### BAY NO. VI. CLINKER CONCRETE.

SOFFIT. Flat. Surface pitted in places about 1 in.



deep where struck by water, and in one place 2 in. deep. One slight crack visible.

TOP. Cracked across into about three equal parts. Curved downwards about  $\frac{3}{8}$  in.

BAY NO. VII. THAMES BALLAST CONCRETE.

SOFFIT. Curved downwards  $1\frac{1}{2}$  in. Several bad cracks longitudinally, extending over almost the whole area in various irregular directions. Surface damaged all over to a greatest depth of about 2"; a hole in one corner through which daylight was seen.

TOP. Cracked in very many places generally transverse, but in various diagonal directions as well. No actual longitudinal cracks on this side. Curved downwards about 2 in.

BEAMS. Portions of the plaster remained on all the beams, but badly cracked and flaked. Each beam had part of the concrete washed off where struck by water. No steel work exposed. The concrete disintegrated about 2 in. in depth on the soffit in patches.

### OUR ILLUSTRATIONS.

THE TRADERS BANK OF CANADA BUILDING. MESSRS. CARRERE AND HASTINGS, NEW YORK, AND MR. F. S. BAKER, F.R.I.B.A., TORONTO, ASSOCIATED ARCHITECTS.

Our illustration of the structural steel-work is from the last photograph taken of the work. Since then the pitched beams of the roof have been for the most part erected and the frame is almost complete. We take the opportunity of repeating the perspective view, which was published in our November number but, by an unfortunate mistake, without the names of the associated architects.

ENTRANCE TO NO. 30 ST. JAMES STREET, MONTREAL.

VIEWS OF NEW CENTRAL AVENUE, RIO JANEIRO.

These illustrations in the Architects' Edition show the construction of a wide avenue cut through the centre of Rio Janeiro by a commission which purchased a strip of land wide enough to include not only the avenue itself but the building sites on each side of it, and by the sale of these sites more than recovered the cost of the purchase of the property and the construction of the roadway. The application of the illustrations is to the allusion to the transaction in the speech made by Mr. Frederick Nicholls at the dinner of the Ontario Association of Architects, the report of which we are obliged to hold over until our next issue.

### ONTARIO ASSOCIATION OF ARCHITECTS ANNUAL CONVENTION.

The Association met for its 18th Annual Meeting in the Association rooms, 96 King Street West, Toronto, at 2.30 in the afternoon of January 16th.

The following members were present:

Messrs. Burke, Baker, Toronto; Belcher, Peterborough; Bishop, Boulton, Denison, Gemmell, Gouinlock, Gordon, Gray, W. R. Gregg, A. H. Gregg, Helliwell, Toronto; Kay, Paris; Kennedy, Barrie; Langton, Law, McKenzie, Menges, H. E. Moore, Toronto; Munro, Hamilton; Nicholson, St. Catharines; Ogilvie, Ottawa; Pearson, Toronto; Power, Kingston; Smith, Stephenson, Sparling, Symons, Toronto; Thomson, Sault Ste Marie; Wickson, Woolnough and Wright, Toronto.

The minutes of the last Annual Meeting were read and adopted.

The President, Mr. Edmund Burke, read the following address:

#### PRESIDENT'S ADDRESS.

The President of the Ontario Association of Architects welcomes you to this its 18th Annual Meeting and congratulates you on the completion of another year of prosperity throughout the whole country in all phases of business, and especially in the extent and importance of the building operations which are so vital to the prosperity of our profession.

#### THE CITY PLAN.

A year ago the Association in convention decided to forward the project of a comprehensive plan for the improvement of the City of Toronto. A committee was appointed with power to add to its number, and members of the Guild of Civic Art, the Toronto Architectural Eighteen Club and the Engineer's Club were invited to co-operate. The Guild of Civic Art kindly financed the scheme securing subscriptions from the citizens to defray the cost of an expert draughtsman, and the necessary printing and other expenses. Weekly meetings for discussion of the various projects were held during the Spring, Summer and Autumn. The result will be presented to you at to-morrow's meeting.

It remains now for the membership of the Association to assist by all possible means the launching of the project. Doubtless a long campaign of education of the public and the City authorities will have to be entered into, as large expenditures will be involved and some radical changes suggested. The plan has in view the future development of the City on comprehensive and right lines. Emphasis will need to be laid, however, on the fact that the cost can be distributed over very many years, that the changes need be but gradual, and that present expenditures can be confined to securing such properties as are necessary to this comprehensive development, and which if lost now to the City, may be forever lost.

It is suggested that the scheme, when adopted, can be best handled by a carefully selected Commission whose tenure of office shall be such as to permit of a consistent and continuous policy.

#### THE COMBINES.

An event which has created widespread interest and comment in the Province and particularly in Toronto has been the exposure of the combines, including those of the plumbers, plumbers supply men, and plumbers trades unions, which have caused such an undue advance in the cost of building.

Architects have been confronted for several years with this serious state of affairs, and the matter was frequently referred to in the meetings of the Toronto Chapter, but no one seemed prepared to offer a solution of the problem of how to obtain a healthy competition in tenders, and the consequent reduction of cost to a reasonable basis.

It is a source of satisfaction to have discovered, through the action of the officers of the law, that such doings are illegal and the perpetrators liable to prosecution. The building public may now take courage in opposing combines of this character instead of feeling hopelessly under their power.

It may be taken for granted that secret actions or combinations which result in undue enhancement of prices are probably illegal, also that the fact of secrecy suggests the possibility of injustice, which again suggests the possibility of secret and illicit combination.

We have learned that there is hereafter no more need of tamely submitting to such combinations, and that if again confronted with a like situation our clients should be at once advised to seek the advice of their solicitors.

#### THE TARIFF ON PLANS.

Advantage was taken of the presence of the Tariff Commission in Toronto last November to present a long standing grievance of the profession, the admission, practically free of duty, of plans by foreign architects, for Canadian buildings.

As administered by the Customs department, the duty on plans has, for years, been merely nominal, being based on the cost of blue prints, as such, without any reference to the value of the services performed in the preparation of the designs or even the cost of draughting the original drawings.

The Government has thus lost many thousands of dollars of revenue during the past few years.

If we had reciprocity in architecture the matter would not be of such serious consequence, but when our plans are not permitted to enter the United States without paying a heavy duty and when our architects are not allowed to practice on the other side of the line, it certainly becomes the duty of our Government to afford us the same protection which it affords to practically every other business or profession in the country.

Your representatives were very courteously received by the Commission and given a patient hearing.

Surprise was expressed by members of the Commission at the state of affairs, and they stated that while the law as passed some years ago had not been changed, the rulings may have been altered resulting in the above anomaly.

The tariff on plans, according to the Statutes, is placed at 2% on the cost of the building erected. On a \$100,000.00 building this would amount to \$2,000. As lately administered a full set of blue prints could be brought in for probably \$10.00 or about 20c. per sheet, if not clandestinely introduced without any payment whatever.

The commissioners requested an expression of our views in writing with a suggested reasonable tariff. The following is a condensation of what was prepared and forwarded:—

#### SUGGESTED SCHEDULE OF DUTY ON PLANS.

1% on the cost of the building, or instead of the above, a rating



of 40% on the amount of the architect's fee which should be put at 2½% on the cost of the building, for plans and specifications.

For detailed drawings the architect's fee should be put at 1% on the cost of the building and the duty 40% of that amount.

#### THE TORONTO ARCHITECTURAL EIGHTEEN CLUB.

Your instructions, a year ago, empowering a committee to arrange terms for the admission and amalgamation of the Toronto Architectural Eighteen Club resulted in several conferences with a committee of that organization, which, however, have so far been barren of satisfactory results.

The draft terms involving certain changes in the Act, which were approved by the Convention, were submitted to our solicitor for the purpose of having such changes drawn up in legal and parliamentary form. He strongly advised against any radical alteration of the Act and suggested simply the transfer of the educational clauses from the Act to the by-laws passed by the Council, where they could be dealt with and modified from time to time.

The Committee of the Eighteen Club approved of this change but failed to secure its ratification by the Club, which demanded more radical changes than your committee were empowered to concede. It remains for the Convention to say whether further negotiations shall be entered into.

#### SKY-SCRAPERS.

The City of Toronto has finally been invaded by its first real "sky-scraper."

In view of the narrowness of the streets of Toronto, especially in the business section, the arrival of the tall building must be looked upon as an unfortunate circumstance and a precedent for further erections of similar buildings.

The introduction of a by-law limiting the height of buildings cannot be advocated too soon.

#### THE TORONTO FREE PUBLIC LIBRARY COMPETITION.

The most important competition in several years, that of the Toronto Library, is now under way. The terms were submitted to the Toronto Chapter for criticism on the eve of their publication. Modifications of several points were asked for and some minor ones conceded.

The Board refused to accept the suggestion that three architects should be entrusted with the selection of the prize designs instead of the selection being confided to that body, which consists of the Mayor, a member of the City Council, a member of the Library Board, the Chief Librarian and the City Architect, with a sixth judge, an architect, who is to be elected by the Board.

The Board raised the limit of cost from \$250,000 to \$260,000, a paltry addition, in response to our protest that the first mentioned amount was entirely inadequate, and that a building of the required size and description would cost nearer \$350,000 than the amount named.

A majority of the architects are holding aloof from the competition feeling sure that the result will be unsatisfactory, while several of the younger men are indulging in a little practice in design, with an undercurrent of hope that by some fortunate turn of the wheel one of them may be selected as the "martyr" who shall be called upon to have the prize dangled before his eyes while he toils at the working plans and specifications in a vain attempt to squeeze a \$350,000 building into a \$260,000 structure and at the same time exhibit some modicum of respect to his burning desire to erect a building which shall be no mean monument to his genius and powers of design.

A prediction may be ventured that the second and third prize men will be the only ones who will reap any remuneration in hard cash offered by the Board.

#### THE NEW HOSPITAL.

The new General Hospital, now in the preliminary stages, promises to prove one of the most important building operations in the city of Toronto.

Its construction on right lines will depend largely on the saneness and breadth of view of the managers of the institution.

The very best architectural advice should be secured and if it shall be decided to throw the work open to competition, no limit of country or place should be imposed.

In any event the architect who is finally entrusted with the work will require to spend months of study of the best models extant, both in the old world and the new.

The opportunity is one of a lifetime and a man or men strong in planning and construction and with large executive ability will be needed to bring the work to a satisfactory conclusion.

#### GETTING WORK AND ARCHITECTURAL ETHICS.

Judging by the expressed statements of some architects and the actions of others there seems to be a tendency to depart from the good old time-honored professional method of waiting for the work to come to the architect.

It appears to be the rule in most businesses in this bustling age that if one desires business he must go out and hustle for it; and in the professions there is a tendency toward more or less advertising in veiled forms, or exploiting oneself more or less openly.

The question arises, where shall the line be drawn. Shall a young and unknown man sit in his office waiting, sometimes vainly, for clients; shall his friends exploit him, or shall he go and offer his services whenever he may hear of a new building project, or shall he depend on occasional competitions, (with abominable terms), for an introduction to prospective clients? And if such things may be winked at in the case of a young and

struggling architect, at what stage of his career shall he drop these methods for the more honorable and self respecting conduct of his affairs?

If he begins in this fashion is he not likely to be so tied up to these habits that he will continue without change to the end of the chapter?

A brother architect in this city who has a tender conscience in such matters argues thus:

"If Mr. Smith has decided to build a house and starts out for the office of a certain architect to give him the commission and I, hearing that the said Mr. Smith is about to build, meet him before he reaches his destination and offer my services and secure the work, I am taking the bread out of the mouth of my brother architect, even though I am all unconscious that my client was on his way to engage another architect at the time."

But perhaps you will claim that this is too ethical, too ideal. Some one has said "Ethics is the science of ideal humanity". And should we not strenuously pursue that science? The true architect steadily aims at the ideal in his creations, and if he be true to himself he will as steadily aim at that "science of ideal humanity" which is summed up in the Golden Rule.

In regard to the architect's relations with his client it will doubtless be acknowledged by all that they are sure to be more satisfactory and that he will yield one more appreciation and respect if he comes unsolicited instead of the architect going to him to beg his work.

A motion will be introduced to-day with regard to the oft mooted question of having the Annual Meeting in other cities in rotation.

It must be admitted that a change in our policy in this respect deserves very serious consideration. The first deviation from our custom would have to be looked upon largely as an experiment, an experiment moreover which might or might not prove to be in the interests of the Association as a whole, while gratifying our members in the city which should be selected. The success of the experiment would depend in a good degree upon our hosts as well as upon the Toronto membership who would have to be prepared to spare both time and means.

It may be claimed with considerable certainty that the past year has been one of the most active in the history of the Association, perhaps exceeding those years when we engaged in an active canvas of the Legislature for further corporate powers, and the thanks of the Association are certainly due those of our members who have attended scores of meetings in connection with the City Plan.

#### EDUCATIONAL WORK.

Progress has been exhibited in our educational work. Some 18 students are now registered in the mathematical classes, and more students have presented themselves for the examinations than for several years past.

Classes in design, managed by the students and supervised by architects acting as patrons, are also well attended.

Personally I have to thank you for the honor you laid upon me a year ago in electing me to a seat in the Council, and my thanks are also due to the Council who elected me to the Presidency during my first year of office.

The Registrar, Mr. W. R. Gregg, read his report as follows:

#### REGISTRAR'S REPORT FOR 1905.

**MEMBERSHIP.**—The Association has a Membership of 70, of which 2 are Honorary Members, 38 regular members in Toronto, and 30 members in other places.

Mr. Kivas Tully, who was a member from the formation of the Association and was made an Honorary Member in 1898, died in April.

Two Charter Members have withdrawn, both having retired from active work in their profession—Messrs James Adams, and S. G. Dolson.

**COUNCIL.**—The Council has met ten times, with an average attendance of between 5 and 6.

**STUDENTS.** Examinations were held in April, and Supplemental examinations in October. Three students passed the first examination, and two are allowed a Supplemental in one subject. Three students passed the second examination, and one is allowed a Supplemental in one subject. Four students passed the final examination, and are now members of the Association: These are Messrs. W. F. Sparling, A. E. Nicholson, Edwin Menges and J. A. MacKenzie.

**GUILD PRIZE.**—The Council has not awarded a prize from the Guild Fund, although the Board of Examiners reported a high standard of excellence in the students, who passed the final examination. The fund has yielded in interest about \$22.

**PROCEEDINGS.**—The fifth volume of Proceedings was published in May; 1500 copies being printed. A larger distribution has been made than in any former year, and exchanges are received from many Societies.

**TARIFF.**—A new Tariff of charges for professional services has been prepared and sent to members. Copies will be sent by the Registrar, whenever requested, to those requiring new supplies.

**R.I.B.A.**—An alliance of this Association with the Royal Institute of British Architects has been suggested, and the Council has referred the subject to the present meeting for discussion.

**EIGHTEEN CLUB.**—On account of a difference of opinion with regard to the manner in which the Ontario Architects Act should be amended, the Council is unable to report an amalgamation with the Eighteen Club.



The Registrar read the concluding letter of the correspondence with the Eighteen Club.

The report of the Registrar was then adopted.

In the absence of the Treasurer, Mr. Henry Simpson, the report of the Treasurer was read by Mr. Gray, who said: "The report has been audited so far as we have been able to go. We have looked over the books and find the statement tally with the Treasurer's books. There is a little account in connection with the bank that we have not got cleared up yet. A very small matter which I have no doubt will be explained when Mr. Simpson comes home."

The report was then received and adopted.

#### TREASURER'S REPORT.

ONTARIO ASSOCIATION OF ARCHITECTS, JANUARY 1906.  
EXPENDITURES.

Printing.....	\$418.02
Banquet.....	98.50
Convention.....	220.10
Engineers Club.....	36.32
Gas.....	6.00
Registrar.....	200.00
Rent.....	93.75
W. R. Gregg's petty cash.....	25.00
Educational expenses.....	172.93
Advertising agents.....	276.50
Council meeting, re Mr. Belcher.....	10.00
Examinations.....	114.47
Insurance B.....	7.20
Bank.....	.75
Membership American Civic Association.....	2.00
Part pay, for cupboard.....	3.50
	<hr/>
	\$1,684.14
Balance on hand.....	324.55
	<hr/>
	\$2,008.69

#### RECEIPTS.

Admission and registration fees.....	\$ 46.00
Members fees.....	258.00
Examination fees.....	152.00
Filing articles.....	6.00
Advertisements.....	931.00
Sale of banquet tickets.....	46.00
Refund, J. Queen.....	5.00
Chadwick's account.....	8.00
Eighteen Club, half expenses.....	41.86
Difference in gas account.....	1
Interest on bank balance, 1905.....	9.90
	<hr/>
	\$1,593.83
Balance from 1904.....	504.86
	<hr/>
	\$2,008.69

Mr. Herbert E. Moore read the report of the Toronto Chapter, as follows:

#### REPORT OF THE TORONTO CHAPTER O. A. A.

The officers of the Toronto Chapter beg to report to the Ontario Association of Architects in Convention assembled:

GENTLEMEN:—At the annual meeting of the Chapter held last April the following officers were re-elected:—Chairman, Mr. Edmund Burke; secretary, Mr. Herbert E. Moore; treasurer, Mr. Alfred H. Gregg.

During the past year 35 meetings were held, the average attendance being 10.42 and a total of 365 which is an increase over the previous year.

The work of the Chapter during the year has been varied and instructive and it is satisfactory to note the increased interest of the members. It has become apparent what a factor the Chapter is in promoting and safe-guarding the interests of the profession in Toronto.

The principal matters discussed during the year are as follows:

1. Affiliation with the Municipal League.
2. Revision of the Architects Tariff of Fees. The old Tariff was thought unsuitable under present conditions, and the whole of the clauses were revised and submitted to the council of the Association for approval.
3. Affiliation of the Association and Eighteen Club. The situation remains practically the same as last year. Negotiations have come to a standstill pending further instructions from the Convention.
4. Tariff Revision of duty on plans prepared in the United States and brought into Canada.

This important subject was discussed on several occasions by the Chapter. The present law was found to be very loosely interpreted and the application unfair to the profession in Canada. A committee, consisting of members of the Chapter and the profession, interviewed the Government Commission which sat here during November and placed before them the disadvantage and injustice of the tariff in its present form. The Commission went into the matter thoroughly, and promised an early and earnest consideration.

5. Modifications and Revision of the City building and plumbing by-laws.

In connection with this matter a Committee appointed by the Chapter awaited on the Board of Control and pointed out the advisability of altering and striking out certain clauses in the recently revised building by-laws, that were found in practice to be either impracticable or unnecessary. As a result the Chapter was invited by the Board of Control to send in a list of proposed changes and modifications. This list was subsequently made and is now in the hands of the Board.

#### 6. Public Library Competition.

The terms of competition as prepared by the authorities were fully discussed in order that intending competitors might have a thorough understanding of same. The general consensus of opinion was that the appropriation is entirely insufficient and that competitors run much risk of wasting their time if the terms of the competition are strictly adhered to.

#### 7. Proposed new Hospital.

The Chapter forwarded a communication to the Hospital Board suggesting competition as the best method of securing proper plans for a building of its character, and later when it was reported that a certain firm of architects had been recommended, the previous communication was supplemented by a statement to the effect that the Chapter would beg to recede from its original position if any definite appointment had been made or recommended.

#### 8. City Plan.

Members of the Chapter on the Committee appointed and others who were consulted from time to time have given their support in the preparation of the City Plan; in fact the present scheme is the result of much discussion during the past few years at Chapter meetings. As this matter will be fully discussed during the Convention it will scarcely be necessary to go into details.

In addition to the subjects above mentioned, various other matters have been discussed at the meetings which were of interest to the profession generally. It is hoped that the year 1906 will prove as successful as the year just closed and that the result will be encouraging not alone to the members of the profession but to the general public. This can only be accomplished by united action on the part of the members.

The report was received and adopted.

Mr. J. Gemmell read the report of the Library and Rooms Committee, as follows:

#### REPORT OF LIBRARY AND ROOMS COMMITTEE.

The Library Committee crave indulgence of this convention for not having found time to take stock of the books for the purpose of reporting any missing or overdue books but promise to report to council and post same on bulletin board.

As was intimated at last convention the rent of rooms has been increased to \$450, \$150 more than last year, \$225 being our share of rent per annum. The engineers have decided to have telephone put in and ask us to share in this expense, and trust that we will do so, as in the matter of lighting our night classes make this service disproportionate.

The first volumes of Canadian Architect have been bound and added to library making the records of the association complete except the year 1890.

We have to acknowledge the donation of four valuable books for the library from Mr. James Smith Hon. Past President.

Your obedient servants,

J. WILSON GRAY,  
JOHN GEMMELL,  
Rooms and Library Committee.

The Registrar: I would like to call attention to that clause about the volume for 1890. If we had that one volume it would fill the gap between the time that our Conventions were fully reported in the CANADIAN ARCHITECT AND BUILDER, and the time we began to publish them ourselves. We should be glad if any member can show us the way to procure that volume and bind it with the others.

It was moved by Mr. Gemmell, seconded by Mr. Gray that the report of the Library Committee be adopted. Carried.

#### PAPER ON FIREPROOF CONSTRUCTION.

BY MR OWEN BRAINARD, C.E., OF NEW YORK.

Mr. Brainard spoke as follows:—

"Allow me, first of all, to express to you my appreciation of the honor and privilege of addressing you to day and I deem it a peculiarly happy circumstance that in the discussion of technical topics and in the furtherance of better standards of work we are not called upon to consider any boundary lines and a man from the States may be called upon to address a Canadian body just as an architect or engineer from Canada would be welcomed by an audience in the States.

The subject of the fireproofing of buildings might seem to be a trite one but its triteness is more apparent than real. There has been for the last ten years, and, indeed for many years before that, much discussion of fire-proofing methods, but this discussion has all made for progress and by reason of this agitation and the constantly accumulating weight of experience, obtained to be sure at great cost by expensive conflagrations, a gradual evolution in fire-proofing methods has been brought about, until, as we look back, we see that there has been constant progress and development, and that this subject is a trite one only to those who conclude that we have come to the end of



our knowledge and that there will be no further developing or perfecting of fireproofing methods.

Even the most brief attention to the recent great fires will convince anyone that we have yet much to learn, and that the problem of protecting life and property in buildings from fire is far from its perfect solution. It is extremely probable that we shall for many years be engaged in the study of it and that we shall not attain to any degree of security without very great effort long sustained.

I have been engaged for the last twelve years in the design and construction of so-called fire-proof buildings, and I have endeavored to use the best methods available, constantly seeking for improvements and yet I deem myself but a learner and student in this field.

The architect and the engineer, engaged as they are in the expenditure of their clients' money, have many responsibilities which should rest heavily upon their conscience; and I consider the question of fireproofing one which should be met with the greatest degree of conscientiousness. I recall the comment of an exasperated owner who contemplated the ruins of a fine building and who was told that his architect had not perhaps paid very much attention to fireproofing. He made this pithy comment, which I repeat without, I hope, provoking a theological discussion: "He paid so little attention to fireproofing in this world that he will undoubtedly have much time and occasion to think about it in the next."

You are operating in Toronto under a very admirable code, instituted, as I suppose, soon after the great fire of 1904, and it has many excellent provisions, better in many respects than some codes which were formulated expressly to provide for high grade fireproofing,—as the Chicago code or the New York code—and in anything that I may suggest to you to-day I shall not have it in mind to criticise this code, but only to impress upon you the necessity of constant revision. The development of building material and the new uses of old material progress and change so rapidly that a code which would fairly meet the conditions of three years ago would to-day stand in need of considerable revision, and, as I believe that the architects in any community should feel that they are responsible for the excellence of building methods and for the quality of work produced, so you should consider that the responsibility of keeping your codes modernized and up to the standard of the best practice rests upon you.

A consideration of the subject of fireproofing naturally brings one to the question of high building practice, for the reason that the fireproofing problems in a high building, that is a building with a steel frame, are naturally more complicated and difficult than in the case of a building of moderate height with masonry walls and steel floor framing.

Our ideal or standard fireproofing work as I conceive it would be a building planned first of all to meet the requirements of its use; secondly, with a view to proper fire-proof construction; that the building when completed should be a stove without a flue, and a stove with many compartments, in any one of which a fire might develop and burn itself out without being communicated to another compartment; or that it should be considered, in respect to possible conflagrations, as a fireproof vault protecting its contents from an attack from without.

In the present state of the art of building and with the present fixed habits or customs on the part of the users of buildings it is not possible to save the general interior finish of a building—the furniture, or, indeed, any of the contents—and we are therefore at the present time striving not to preserve the building and all its contents from fire but to increase the amount of salvage. Furniture is still made of wood and will be for a long time, carpets and rugs will be demanded until our standard of comfort is changed; curtains, papers and books and all of the thousand and one articles that go to make up the contents of a building, are so much fuel and we can only succeed, if we succeed at all, in protecting this fuel from attack from the exterior or in preventing from burning to destruction the compartment in which it is placed.

Because our problem is largely one of salvage, economical considerations control us to a considerable extent in fire-proofing work.

It would undoubtedly be possible to construct a building which would withstand the attack of any conceivable outside conflagration and which would be so planned that a fire in any compartment could not possibly communicate to any other compartment; but such a building would at the present time be commercially impossible; therefore we are obliged to steer a middle course between what we conceive to be the best possible construction and the construction which is economically possible.

I have not given exhaustive attention to insurance rates, but so far as I have studied these I have felt that the insurance companies were not making fireproof building construction sufficiently attractive to owners by a reduction of rates.

I am not going to appeal to the conscience of the Insurance Companies, for an obvious reason; but I shall attempt to appeal to the intelligence, as they are the people who bear the burden, for the community, of the fire risk, and to suggest to them that so far as they stimulate the added investment of the owner's money in the fire-proofing of buildings, they are to that extent, perhaps to a greater extent, protecting themselves from the spread of great conflagrations and encouraging the raising of the standard of building construction, until such time—which is of course the millennial period—when fire insurance companies shall no more exist.

The fire risk as I have already indicated has two aspects; one the external risk from the burning of surrounding buildings, the other the internal risk from fire in any compartment.

The history of all the great conflagrations, such as the Tor-

onto fire, the Baltimore fire or the Paterson, N.J. fire, shows conclusively that in any city, even the most modern, the risk from external conflagrations is much the greatest. In Baltimore there was a vast area of small, low poorly constructed buildings surrounding a few comparatively modern and reasonably well built structures; the fire, starting some distance from the high buildings, became, under the influence of the high wind, a long flaming torch which, lashing against the high buildings, at once pierced the windows and swept through these buildings from side to side.

The progress of the Paterson fire was much the same as in Baltimore; here the high buildings or fireproof buildings were seriously injured by the fire blazing in the surrounding, low, combustible buildings. A high building in an isolated situation is therefore subject to very great risks, much greater than would be the case with a low building in the same situation.

In the city of New York we had a situation which is, perhaps, different from any other in the world. There, by reason of geographical conditions and by reason of commercial habit, we have a comparatively small area where the most valuable business of the country is condensed, as it were, and where ground values are so very great that it is commercially possible to build to a great height and get large returns. We have consequently in New York a comparatively restricted area of very high buildings. That area is roughly from Battery Place to Fulton street and from West Broadway over to William street—a comparatively small area. There you have a large number of buildings in which there is a comparatively small percentage of inflammable or combustible material; but there are very few situations like that, and we have to contemplate the building of structures, conspicuous by reason of their height, in the midst of low buildings with possibly masonry walls but with timber floors, and therefore exposed to very great risk from without. My relation to fires in Toronto is indicated by that situation. I have had to do with this problem of an isolated high building in a busy commercial city, but a city which is, I believe, at the very beginning of its high development. I had the pleasure last evening of attending the banquet of this Association and I gained from that meeting, by listening to the addresses, a new idea of the possibilities of Toronto. But I believe you will see, as I, an outsider, will see, that Toronto is at the beginning of things; that you are probably destined to begin very shortly an area of very large building improvements, necessarily occurring in the central part of your city, and that you will have to face this question of fire risk in its commercial aspect, and for that reason I am going to offer you suggestions which have had their germination in my experience in Toronto. They are the suggestions of a man "red from the field" so to speak. I have had, by reason of other multitudinous professional engagements, very little time to prepare, and so I shall talk to you about the things which occurred to me and which are brought to me in my daily practice in Toronto and in cities of like character. I am assuming that you have to build structures with a steel frame. These frames are solely for structural requirements and to meet structural conditions. That is, you do not put into one or two thousand tons of steel any very large margin to take care of fire or anything unexpected. You make your steel just up to the limit and there you stop. Now if you are going to make that building reasonably safe from the standpoint of fire risk, you have got to protect that skeleton, you have got to put a skin on it; and if you are going to make it a really first class fire-proof building, you have got to put fat on it. I shall talk to you about the skin and urge you to put the fat on besides.

How to protect this steel skeleton. Now at the outset, departing from timber constructions, architects supposed a steel member was fire-proof. There never was in the world a greater fallacy. The other day I had an opportunity to observe the wreck on the Lackawana & New Jersey Central Ferry House. There were two large buildings constructed entirely of metal. The only parts of the buildings which were not of metal were the floors. The plaster was on metal lath; the trimmings and doors were of metal. That wreckage looked, from the river front, very much like a bird cage that had been put into a bonfire. It had sunk together, the wires twisted and matted together like hair. There was seemingly very little in the building to burn, and yet that steel cage was a wreck. That is the result which we find in every example of unprotected steel. There is nothing in the world more dangerous than unprotected steel. In the case of the Home Life Insurance Building in New York, which was destroyed or at least seriously impaired by a fire five or six years ago, we had the steel cage reasonably well protected with masonry, with fire-proof floors, and on the whole a first class example of the fire-proofing of that period. The stone front of the building was seriously damaged. Some of it had to be entirely replaced. But the most serious damage to that building was due to steel tie beams which ran across from one wing to another and which were not protected. The fire from the adjoining building, lashing against these steel tie beams, expanded them and threw the wings out of plumb. I have never seen a more striking example of the damage caused by an unprotected steel structure than that. The building was seriously damaged, but at the same time the salvage in it was a very high percentage of the total cost, except for the fact that a man had put a steel beam across the court and had not protected it. If it had been protected the two wings would not have been disturbed and there would have been no task except the replacing of the stone work and interior trimming.

The task of repairing the building was exceedingly increased and rendered more difficult by that single unprotected steel member. We must therefore at the outset address ourselves to the task of protecting the steel skeleton. In an ordinary



situation the foundation is a negligible quantity. Our experience in recent conflagrations shows us that stone is one of the most dangerous materials to depend upon for the protection of the steel skeleton. None of the different stones meet even the reasonable requirements of fire resisting qualities. I had occasion to examine the burned district in Baltimore directly after the fire; and there I found a most interesting example of the unreliability of stone in the Government bonded warehouses, built about 1845. They were made with solid granite walls and interior piers, with groined arches between these piers. Absolutely solid masonry throughout. The granite piers were approximately two feet on the square. In one story of the building was stored a large quantity of alcohol. Fire was communicated to this alcohol by flying cinders from without, and the burning alcohol had absolutely burned out these two foot square granite piers. In one case there was no vestige of the piers left but a pile of sand on the floor. Absolutely gone. In other cases the piers were burned off, rounded off to perhaps a diameter of 12 inches. Nothing could be more untrustworthy than granite in a situation of that sort. Marble is almost but perhaps not quite as bad as granite. The limestones are a little bit stronger; but for fire-proofing purposes stone is practically out of the question and negligible.

We come then to the burned clay. I suppose there is nothing so good to resist fire as burned clay in one form or another. Certainly the test of actual use in conflagrations indicates that well burned brick is the best protection against fire that we can have. If we could always use brick, the protection of our steel frame and the armour of our floors would be obtained. But we cannot always use brick. An architect does not want to use brick because it is necessary to embellish his façade. Therefore he very reasonably turns to stone or to terra cotta. Preferably to stone because it is more expressive. For one reason or another we cannot always use brick for the façade. Terra cotta is of course practically brick, except that it is made in thin members, generally with large voids; and whether it is structural or decorative it has these voids. We would suppose that terra cotta would resist any ordinary conflagration, because it is burned at a very high temperature in manufacture. But in the Baltimore and also in the Paterson fire some of the terra cotta failed to a conspicuous degree. The lesson I deduced from the Paterson and Baltimore fires was that terra cotta was generally made too thin and that it was not burned at a sufficiently high temperature. Of course in the production of delicate shades and to meet the architect's desire to accurately match colour in the imitation of stone, or the matching of brickwork, they make mixtures of clay which will not bake very hard and which will not stand very great heat. As a matter of principle I think we should use terra cotta only in that form and that mixture of clay and those colours which will stand very high initial temperatures so that in case of a conflagration we shall have no failure. In the Baltimore fire there were examples of the actual frittering away of terra cotta under the influence of the torch of flame that I have before referred to. However, terra cotta has been regarded for a long time as one of the best fire-proofing materials. The forms used in the construction of floor arches have been considered very good; far in advance of any other fire-proofing method; and many acres of this work are in use and have stood the fire test very well. The fire test has revealed faults in the design of the parts. It is perfectly possible to construct fire-proof floor arches of terra cotta, which will stand up against any ordinary structural stress. You can make it either of end construction or the old fashioned side construction, and it will stand up against any ordinary loading. For that reason you might suppose it would be good for any ordinary fire. The truth is that the cellular construction of the ordinary floor arch was much too light; and as manufactured and put upon the market I am inclined to believe that it is exceedingly defective. Personally I prefer the side construction arch.

In the construction of the walls we come to the real joint in the armour. It would be idle to theorize about a building without windows. We must have windows of adequate size. If we did not we could not rent or use the space within the building, with any comfort. Consequently we must accept the window opening as a thing required, and it rests upon us to solve the question of protecting these window openings. The Insurance people have attempted to help us a little about this, but they have not helped very effectively. They tell us that if we put in wire glass they will reduce the rate so much; if we put in metal covered frames they will reduce the rate still more. I believe in the protection of window openings, but it is within the second class of duties; that is, it is an economic not a humanitarian consideration. I believe that, even theoretically, no perfect solution of the protection of the window openings has ever been put forward. I look favorably upon wire glass, and upon metal covered frames and sash, and indeed upon solid or cast metal frames and sash; but none of these have ever been thoroughly tested in a great fire and they are therefore a matter of theory. Nevertheless, it is easy to see that a metal covered or metal sash with wire glass would be a protection to the building. Because it is economic it becomes entirely a question of how much reduction we can have in insurance rates if we put in these particular features. Thus far the insurance people have not met the protection of buildings by this equipment with any corresponding reduction in rates.

Next to the risk from the window openings, we have the risk from the roof. The insurance people have recognized this; but the people engaged in actual construction have not yet realized that the roof should be as much a part of the fire-proofing as the wall. I have seen, in the Paterson fire, a roof covered to

a depth of six inches with heavy cinders, which, after 36 hours, were still smoldering, and I have seen the steel frame of this roof, six inches below the roof armour, warped and twisted by that heat. Now it is not difficult to make a fire-proof roof except for the sky-lights. In the example of the bonded warehouse in Baltimore, which I cited, the weak point proved to be a sky-light. A flying cinder something like two feet in length and two inches thick, blazing, fell on the glass of the skylight and through it to the bottom of a light well, and there communicated fire to a single floor of that building, and the result was the disaster which I have described. But for that hole in the roof, the building was perfectly armoured. Wire glass would seem to have solved the question of sky-light protection. I am inclined to believe that properly used it may be the end of that question, provided that the glass is made heavy enough and the wiring heavy enough. If you do not use wire glass, you should use a wire mesh over or under the glass. I am myself using wire glass for sky-lights, not only for the fire risk but for the protection of those using the building below from the danger of breaking glass.

Now the interior of the building. Fire-proof floor arches have in many cases stood the test of heavy fires. Sometimes they fall. They are very apt to fall, not from mere incineration, but being weakened by the fire they fall from some slight impact from falling furniture, or perhaps the fall of a ceiling above. I have seen a pile of safes in a building fall through six stories. One on the first floor from the top fell by reason of the burning away of a six inch sleeper or skid under the safe. This drop of six inches took the safe through that floor, going through to the floor beneath, carrying that with it and so on in succession to the basement. I consider the upright arch as now constructed and as ordinarily purchasable to be too thin, too near the margin. We shall come to heavier sections, and unless something else is produced I shall have to regard the terra cotta arch as the best thing available. The first conspicuous comparative test of concrete compared to terra cotta occurred in the Baltimore fire. There were very few examples of the concrete floor slab as compared to the terra cotta arch, but these behaved so admirably as to lead most of the engineers and architects who examined them to recommend the use of concrete. I am not prepared to go as far as that general recommendation. I regard concrete, reinforced properly, as one of our most valuable materials, and, if I could have it put in as I desire it, I would use it for fire-proofing in preference to the terra cotta arch; not because I wish to endorse the principle of concrete as compared with fire clay, but because I can make concrete slabs as I want them and I cannot make terra cotta arches as I want them. I believe a concrete slab—reinforced with steel somewhat beyond the structural requirements, that is beyond the loading tests, and with a sufficient thickness of concrete under the steel member to protect it from fire, forming thus a fabric continuous over the whole floor, with fibres of steel protected from any possible attack from the flame—is an infinitely better material than the terra cotta arch as now manufactured. There is a good deal of strife with respect to the merits of these two materials, and the reason I prefer concrete is, as I said before, that I can make a concrete slab as I want it, and I cannot make terra cotta arches as I want them.

For the purpose of fire-protection we must go far beyond structural requirements. The chief evil in modern practice in regard to fire-proofing has come from the supposition or from the decision by the structural engineer and architect that he had done his whole duty when he had made the building structurally strong. That is what I mean by the fat on the building. You have to put skin on the building to cover it; but if you are going to make it fire-proof you must put fat on the body.

I do not regard partitions as very important, except the enclosures of light wells and stair wells. I do not regard the mere dividing partitions as very important. If you have a fire in one floor of the building, unless you make your partitions exceedingly thick, commercially impossible, you are bound to communicate that fire to other compartments. Structural walls may be made sufficiently thick to resist fire but it is not possible to make the mere partitions heavy enough to resist the fire. I have latterly discarded, within the building, all materials but hollow clay blocks, that is terra cotta blocks. There has been a resolute attempt in the last few years to introduce the reinforced concrete or plaster partitions. I believe in reinforced concrete for general use. I do not believe in it for partitions unless made so heavy as to resist a general fire. I have seen repeated examples of the failure of the thin solid partition. Take the case of a partition three inches thick, of plaster and sawdust, or concrete and cement, with a reinforcement of steel, it is reasonable to expect that it will fall. There is not enough fat on the outside of the steel to protect it from warping, twisting and falling. Ordinarily partitions will reach from 9 to 12 feet in height. When you consider a 3 inch partition, 12 feet in height, with a steel core member subjected to the heat generated even by the furniture we will say of this room, you will see at once that it is almost impossible that that partition should maintain its integrity. It is bound to warp and the moment it warps it is gone. So I believe in a comparatively thick but comparatively light material, and the terra cotta block meets this fairly well. I would always prefer a partition of considerable thickness; the difference in price is inconsiderable, the increase in the fire risk is very great, in the case of the thin partition; and for that reason I consider the thick partition, however light, as the safer thing.

In the construction of partitions, as indeed in the construction of floors, we depend on the cement mortar. As I said to you at the outset, I have no other intention than to make suggestions as to fire-proofing, and also in the matter of the Fire Code. If I recall the Code correctly, I could build here in Toronto fire-



proof partitions with lime mortar. Now I regard that as a very serious defect. I could, I believe, use Rosendale cement mortar. I think that is also defective. When you come to the revision of your building Code—and of course you will come to its revision, because a progressive community has to revise its Code every three or four years. I do not know whether I am touching local pride or not, but do not have any false pride about that. You cannot know as much now as you will three years hence. Therefore when you are three years older you must do something to your building Code. It is about three years old and perhaps you ought to do something now, but if you do anything about it you should insist upon the use of Portland cement for all fire-proof work. By Portland cement I do not mean a cement which tests up to 400 pounds under the 7 days test, but I believe your code—you will correct me if I am wrong—does classify all cements as Portland which test to 400 pounds in 7 days. That is not Portland cement. Rosendale or natural cement from some fields and under some conditions will test to 400 pounds, but that cement is an absolutely untrustworthy material in a fire. Portland cement, by reason of the high temperature under which it is burned in manufacture, will resist fire to a much greater extent than Rosendale cement or lime. For that reason I urge you to insist upon Portland cement, and in proper proportion. Mortar of 5 in 1, as a good many people use it, of 4 in 1, or even 3 in 1 will not stand up under a fire. It should not be expected to, and yet people do use it and do expect it to stand the test.

I have said nothing about the protection of light shafts and stair wells. It is perhaps unnecessary to dwell upon it further than to say that the walls should be strong enough to enclose a fire, and that the openings should be protected by automatic fire-doors. All that is possible, and your Code admirably provides for that.

Fire escapes come under the first consideration in fire-proofing. That is, it is a humanitarian matter. We must get people out of a building before they are smothered or roasted. A fire-escape does not need to be made of fire-proof material. I think wood is perhaps better than steel. A steel fire escape sometimes gets so hot that it is uncomfortable, and this occurs with steel before wood commences to burn. I came down a steel fire-escape in the Windsor Hotel fire, that was quite uncomfortably warm.

I shall conclude by calling your attention to this aspect. We have been for 15 years at least engaged in this battle with the fire fiend and ingenuity galore has been exercised upon it. We have studied it conscientiously, and all of us, I believe, are conscientious in the expenditure of our client's money. But, let me say to you, gentlemen, that we are not half through the battle. If any of us live 25 years more we shall see such improvements in fire-proofing and the protection of buildings that we will be almost ashamed of the things we are doing today. I am striving with all my heart and soul to protect the buildings I put up, from the fire risk. I neglect nothing that is economically reasonable to protect them; and yet I believe 10 years from now I shall look back at these things and perhaps not be ashamed of them, because they are honest efforts, but I shall look back with some pity at my present efforts as amateurish, so I ask you to study and try to solve this problem, which is so vital to us all, both from the humanitarian and economic standpoint. (Applause.)

The President: I am sorry, gentlemen that we shall not have much time for discussion, and any time we do take will have to be borrowed from that allotted to Mr. Langton. I am glad to see that there are several insurance men here and we shall be pleased to hear from them in regard to any points they may have to raise, and Mr. Brainard I am sure will answer any questions that may be brought up. If our insurance friends are too modest to speak we will be glad to hear from others in the room.

Mr. MacKenzie: Mr. Brainard did not mention the steel column. I would like to ask what he considers the best method of protecting the steel column?

Mr. Brainard: I am glad you asked that question. There were a lot of things I wanted to talk about, but the time is short. That is one of the important things. There is another which I forgot. I should insist that no steel member should under any conditions be covered with a less thickness than 2 inches. One of the faults in the terra cotta floor arch was that they put a thin flange,  $\frac{3}{4}$  of an inch thick, under the steel beam flange, and let it go at that. A most fallacious practice. There should be 2 inches of fireproofing, either concrete or clay fastened to the steel, without any voids in every case. As to columns, which was the particular question, I believe first of all in filling around the column solid, so that all voids—that is if it be a channel or C-bar column—shall be filled with Portland cement. That is partly for rust protection and also for the purpose of filling all voids so that there will be no fire flue. Outside of that I would put 2 inches of concrete, with a steel reinforcement bedded so that the fire cannot get at it; or else fire clay, that is terra

cotta, with steel binders, so that in case of fire it cannot fall off. I regard the steel tie embedded in terra cotta as one of the essential things, but I would have my column filled with cement for rust and fire protection, outside of that reinforced concrete or terra cotta.

Mr. W. R. Gregg: Mr. President, I have much pleasure in moving a vote of thanks to Mr. Brainard for his very useful paper. I am sure we all appreciate it. I do not wish to go into a discussion, but perhaps we may have on some future occasion an opportunity for a categorical meeting.

Mr. Gordon: I have much pleasure, Mr. Chairman, in seconding that motion.

The President: I am pleased indeed, Mr. Brainard, to convey to you the thanks of the convention for your admirable address. Among the many important points referred to, that of the periodical revision of our building Code is one of the most important. If we are going to progress we must keep pace with the art by improving our Code. I have very great pleasure in conveying to you the thanks of the Convention. (Applause.)

### TORONTO BUILDERS' EXCHANGE.

The annual meeting of the Toronto Builders Exchange was held on Monday, January 15th, at the offices of the Association, Yonge Street Arcade.

The meeting was well attended, and in the absence from the City of the President, the chair was taken by Mr. George Duthie, Vice-President.

The Directors report for last year gave a resumé of the work accomplished, and taken on the whole, satisfactory progress was shown. The present premises being too small for the growing membership, negotiations are in progress for more commodious and convenient offices.

The balance sheet for 1905 was a satisfactory statement, and compared well with that of previous years.

As the last annual banquet proved so satisfactory the meeting decided to hold the next banquet at an early date:—The Board of Directors will appoint a committee to make arrangements for same.

The election of officers for current year resulted as follows: President, George Duthie; 1st vice-president, Thos. W. Self; 2nd vice-president, C. W. Batt; treasurer, James Crang; Directors, Thos. Christie, J. R. Hoidge, John Aldridge, Henry Martin, John Maloney. Auditors, Geo. Clay, C.C.A., Fred Holmes.

The following resolution was moved by Mr. Richard Kirby, and seconded by Mr. John Maloney. That the retiring president, Mr. J. R. Hoidge, be tendered the thanks of this exchange for the very efficient manner in which he has filled the position during his term of office." Carried unanimously. The president-elect, Mr. George Duthie, briefly addressed the meeting, asking the co-operation of members, in carrying out the work of the Exchange. The meeting adjourned at 5 p.m.

### LONDON BUILDERS' EXCHANGE.

At the annual meeting on the 15th. inst. Encouraging reports were presented from all the officers.

The following were elected as the new officers for 1906:—President, Geo. C. Young; vice-president, John Whittaker; 2nd vice-president, Geo. Hyatt; secretary-treasurer, Geo. S. Gould; directors, Jno. Jones, A. Nobbs, Chas. Gould, T. Wright and D. Stratfold.

Several matters of importance were discussed, notably the Employers Liability Insurance. Some of the members have discovered to their cost that their policies are so hedged about with conditions that they are worthless to a building contractor. A committee was appointed to take measures towards rectifying this matter. It is felt that to deal with matters of this kind a Provincial Association is required. Such an association could demand and obtain the needed amendments to the Employers Liability Act and to the policies issued by the Guarantee companies to safeguard the interests of contractors.



## INTERCOMMUNICATION.

[Communications sent to this department must be addressed to the editor with the name and address of the sender attached. Not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries neither do we undertake to answer questions in issue following their appearance.]

From an "Apprentice":—Will you please describe how to make an adjustable rack for a book-case so that the shelves can be moved to accommodate any sized book?

Ans.—We show in the illustration Fig. 1, 2, 3, how this may be done in two ways, Fig. 1 shows what is termed the zig-zag or saw-tooth method, which is very old, for supporting the shelves. A much better way and more simple is to take a piece of thin pine board, say half an inch thick, and bore a number of holes along the centre as shown in Fig. 3, with a fastener or other suitable bit, and then saw it down the centre. The sketch explains what I mean. Besides being made in far less time it is much stronger and neater than the older method.

From "Old Country Contractor":—I have the interior of a drug store to design and finish, the wood-work to be in white pine painted white, also prescription desk. The room is 31 feet long and 15 feet wide. Prescription desk or case to be in the rear. Please

connection with the same, we may mention some of the remaining fixtures.

Fig. 4 represents a longitudinal section taken through the front window and main part of the store, showing a part of the elevation of one of the wall cases behind the counter.

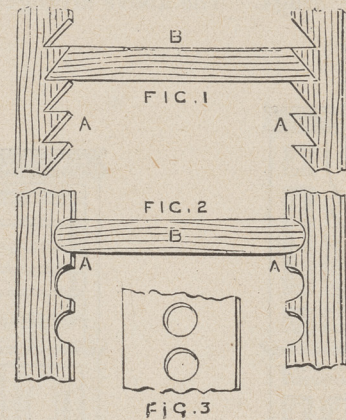


Fig. 1.—Old style. A, A, Uprights; B, Bearer. Fig. 2.—Improved mode. A, A, Uprights; B, Bearer. Fig. 3.—Mode of preparing uprights.

BEARERS FOR BOOKSHELVES.

This show window on the inside, is provided with sash doors glazed with plate glass, which may be hinged to swing in. The sash can easily be arranged to slide if desired, and this is, by some druggists,

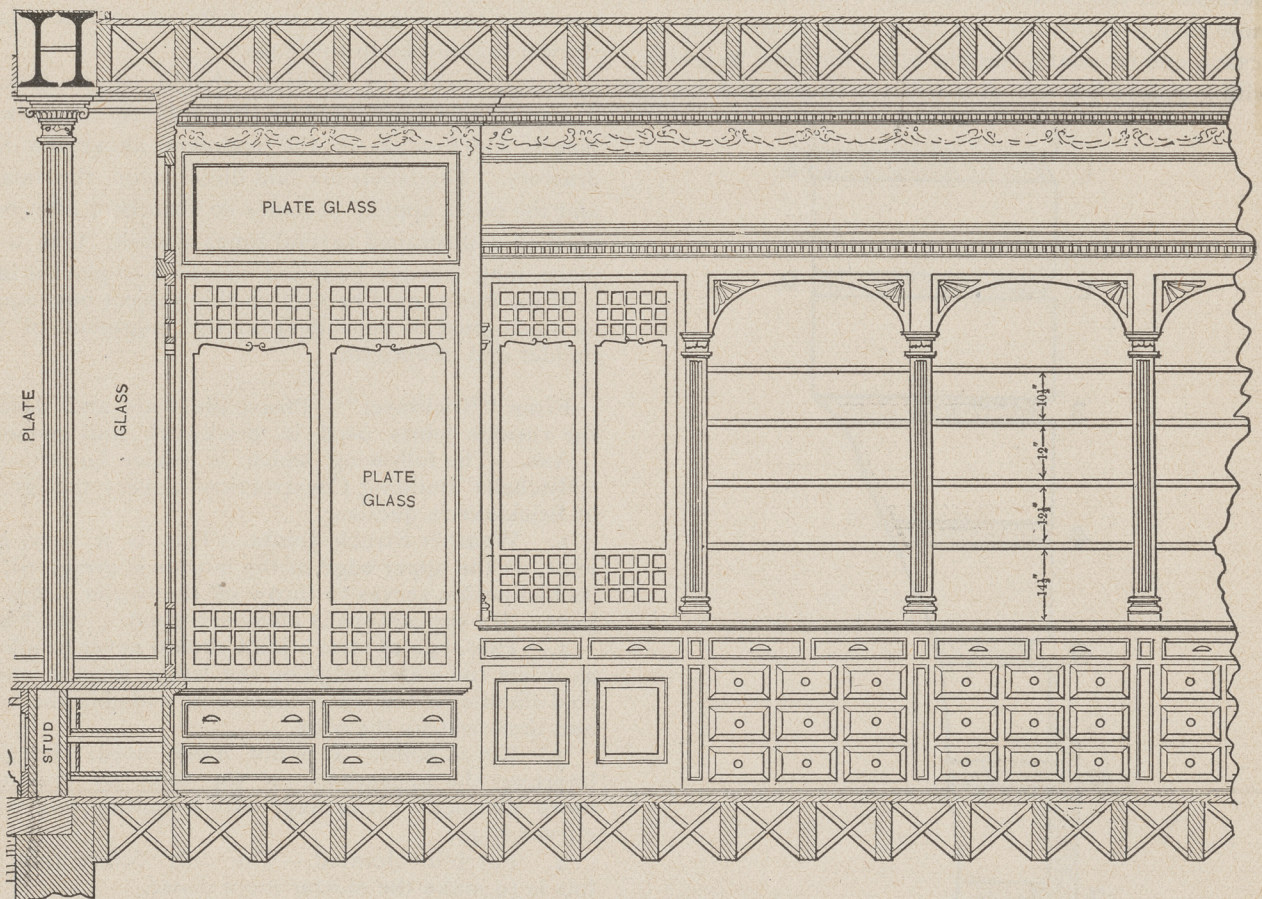


FIG. 4.—INTERIOR OF DRUG STORE.

show a design for shelving and give me such other information regarding the finishing of shop etc., as you may think would be of use to Me.

Ans.—To answer all these queries in full would take up more space than is allotted to this department. However, we submit the following: Having determined the proper arrangement and dimensions of the counters, as well as the drawers, shelves, etc., in

considered the better method, as the glass is not so liable to get broken, and the opening of the doors does not take valuable space. Underneath the window stool are two tiers of drawers for fly papers, etc. At each end of the case is a compartment for patent medicines and labeled goods. These compartments are also provided with glass doors to protect the goods from dust and flies.



The open cases between are for the different sized bottles and jars. The height of the shelves should not be less than the dimensions shown, and where possible should be somewhat in excess of those dimensions. In the lower part of the case may be closets for storing small casks of liquors, jugs, bottles, etc. The drawers are used for drugs. The above arrangement permits

boxes, and utensils, so as to bring together the things in greatest demand.

The front of the prescription case should be glazed with ground glass in the usual manner. The desk for copying prescriptions and writing labels should be placed in front of a window. On one side there should be a little closet for prescription books, and on the

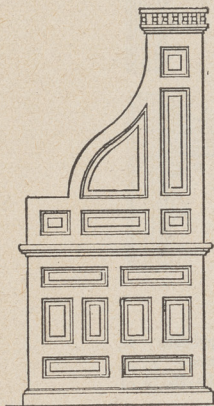
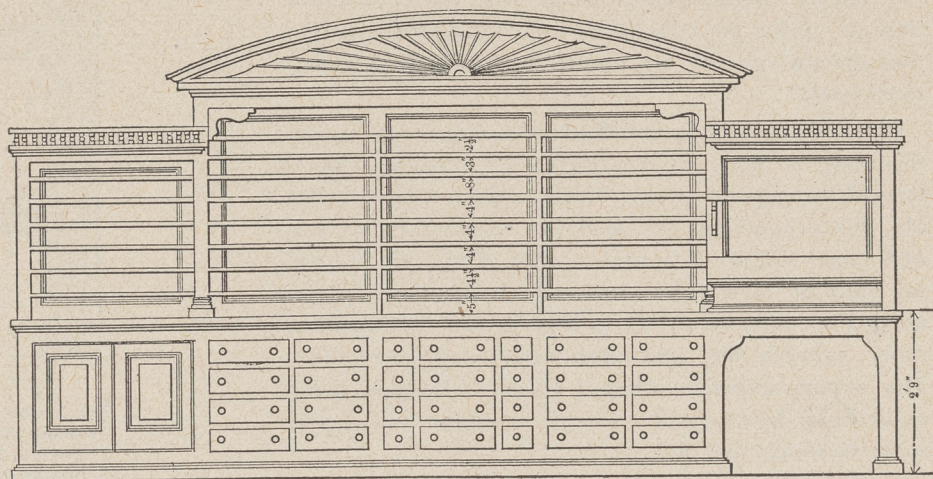


FIG. 5.

FIG. 6.  
END AND SIDE ELEVATION OF PRESCRIPTION DESK.

the proprietor to hide such goods as are likely to injure the appearance of the cases.

Fig. 5 shows the side elevation and Fig. 6, the rear elevation of the prescription case. The counter is of more than usual width, and has a desk at one end; two scales, one for coarse and the other for fine weighing, with a space for a row of mortars between, and a shelf

other a closet for pills or tablets, which should be alphabetically arranged in tin boxes open at the top, and which should slide in on the shelves. The front of these boxes should be higher than the sides, to give space for the names of the different makes. Label drawers should be in this case.

Arrangement for pasting should be as follows: Tinned copper paste holders should be set in hardwood boards which slide in the counters above the label drawers. The labels are laid directly on the boards, and the paste applied becomes so absorbent after being washed and scraped several times a week, that a dry place may always be found on which to place a label.

Much more could be said on this subject but equally as much must be dependent on the judgment of both builder and proprietor.

From "Bricklayer":—Please illustrate and describe the various joints used in brickwork and masonry?

Ans.—The following which is taken largely from "Mitchells' Building Construction" covers the ground of Bricklayer's queries.

1. Weather Struck Joints.—This is a very good joint, as the upper edge of the mortar is projected, and its inclination serves to throw off the water from the joint. Its appearance is also very good. See Fig. 7.

2. This type of struck joint should never be allowed as it lets the water lodge on the ledge formed and in cold climate, if the water freezes, it will chip the bricks and thus destroy the edge.

3. Keyed Joint.—It is not much used, though it improves the appearance of the joint by making it more distinct. It is made with a jointing tool with a curved edge.

4. Fat Joint Jointed.—The only defect this joint has is to make the mortar more dense.

5. Recessed Joint.—This joint is very pleasing to the eye, forming a deep shadow, although it should not be used in severe climate for the same reason as that given for the struck joint No. 2.

6-7. Keyed joints are sometimes made in this form when a wall is to be rendered.

8. Mason's V Joint.—This is the joint mostly used by masons.

9. Flat or flush joints are formed by the mason as the work progresses, the mortar being scraped off flush with the wall.

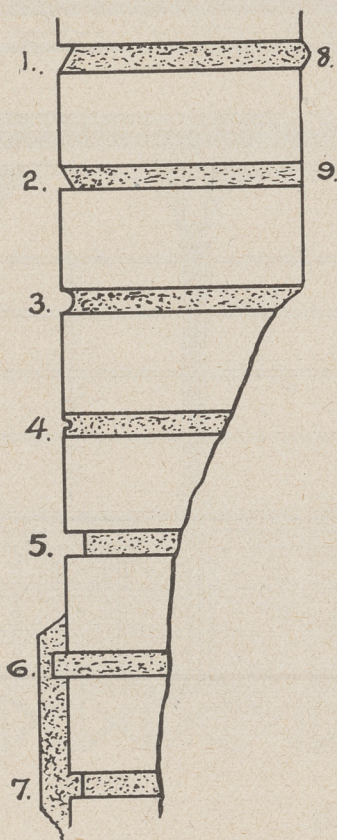


FIG. 7.—JOINTS IN BRICKWORK.

for different sized gradwaters, all in easy reach. The drugs which are most used are kept in the prescription case, and as the bottles are usually small, the shelves and the spaces between them are quite narrow. The space under the prescription counter is carefully divided into closets and drawers for empty bottles, pots,



## MONTREAL NOTES.

A short time ago a lady whose record for artistic accomplishment is somewhat beyond the reach of material missiles expressed the opinion when in Canada that this country lags behind in the finer works of the human mind. The reply she met with must have convinced her that there was more truth in her criticism than she had fancied. Certain of us have, however, higher aspirations. Sir Gilbert Parker has been urging us to remember that progress in material things will profit us little if we lose the "soul of things that matter". He suggests the foundation of a National Art Gallery and says that if Canada does not within ten years possess such an institution he would believe that the people lacked that spirit of imagination without which real progress is impossible. Recently we have a suggestion from one of our own aldermen that, as the inclusion of St. Henry, St. Cunigond and Villeray in the city is likely to lead to a state of congestion in the offices of the City Hall, a new and improved City Hall should be built on the Champ de Mars and that the present City Hall Building should be utilized as a museum and art gallery. Such a suggestion aims well but fails in two respects. The makeshift way of arriving at a museum and art gallery, apparently as a very passable way of utilizing a discarded building, is not the most likely to lead to the best results and further we cannot afford to lose the open space provided by the Champ de Mars. There is property on Craig street directly or almost directly opposite this open space which is crying out to be improved and which would form an excellent site for a public building. If it be objected that Craig street is not a fine enough locality for such a building it need only be pointed out that it is the widest of the down-town streets and is certain to become the finest. The recent widening of its continuation in St. Antoine St. will prove a great stimulus to its improvement, as it now forms a wide and convenient highway connecting the railway stations at the west end with that at the east end of the city. The recent purchase of a large block at the corner of Craig street and St. Urban street by the Montreal Light, Heat & Power Company is likely to be followed, one may expect, by the erection of another substantial building, and a few more such will soon change the somewhat poverty stricken appearance of this part of the thoroughfare.

As regards the Museum and Art Gallery itself, we should prefer to see the subject approached from the point of view lately suggested by Professor Nobbs, that is, as an exhibition of skilled work having for its purpose the raising of the artistic quality of Canadian industrial products. Such a collection is an urgent necessity and would be a living influence and inspiration in our midst. An Art Collection made merely with a view to increasing the City's magnificence would be apt to sit like a gilded and neglected sarcophagus amongst our thousands bent on earning their bread by the sweat of their brows and with little time to spare for what has no obvious bearing on the work of their hands.

In the December number of the Canadian Architect and Builder attention was called to the general air of untidiness caused by the overhead wire nuisance in Toronto and if any Montreal councilmen are anxious to distinguish themselves as reformers of the aspect of the City they could not do better than begin by dealing

severely with the companies which, by virtue of powers said to be conferred on them by Legislature, gaily make unsightly wildernesses of our streets.

According to the Building Inspector's report the total value of buildings for which permits were granted during the year 1905 amounted to \$5,590,698, which is in excess of previous years. True to the reputation of the city for conservatism the character of most of the work shows no radical departure from customary usage. From a purely architectural point of view conservatism is oftener than not one of the highest virtues and in regard to the choice of materials one cannot be too glad to see the continued employment of and the grey limestone of Montreal and the district between Montreal and Quebec. It is true that the refractory nature of this stone does not lend itself readily to the sumptuous quality of carving that pretentious office building is supposed to require, and hence for such buildings Indiana and other sandstones from the United States are coming more into vogue, as in the Sovereign Bank Building in St. James Street, the uncompleted Lindsay Building in St. Catherine Street, the dressings of the building being erected for Messrs. Joyce in Phillips Square, and the recently finished Strathcona Hall in Sherbrooke Street. In the basement stage of these and many other buildings one sees more and more grey granite employed from the Stanstead and Memphremagog district. The buildings of Mount Royal Club and of the McGill Students Union, both in Sherbrooke Street, are faithful to the Montreal limestone and both have sufficient breadth of surface to exhibit well the unsurpassable delicacy of tone of this great stone.

In brickwork the facing of the Joyce Building, already referred to, in Phillips Square, affords a very agreeable innovation in a pale reddish brown brick made by the Montreal brick syndicate, and in the McGill College Avenue elevation of the Strathcona Hall as well as in the new Hampton Court Apartment Houses in Mountain Street an extra long yellow brick of fair appearance, building six courses to the foot, has been employed. The Laprairie Brick Co., which has lately extended its manufacturing premises, is promising a larger output and asking counsel of architects regarding the desirability of having on the market bricks of specially large and flat proportions.

Some experiments if only in a small way are being made in concrete building the purpose being generally the cheap construction of small dwellings. Some houses of this class have recently been built, out St. Denis Street, of concrete or artificial stone blocks. Another has been constructed with one foot walls of concrete thrown into boarded casings in situ. At the new Agricultural College Buildings, being erected at St. Anne's, the walls of the basement storey, carrying internal walls over, are made thus one foot and a half thick, but the external walls are of stone. The facing brick of these buildings are from Milton West. A novel experiment has made its appearance in the start of a new building apparently a dwelling or set of flats in Dorchester Street at the corner of St. Matthew Street. The basement, which is all that has been erected so far, is made of re-enforced concrete hollow walls. The face of the wall consists of L shaped slabs about 10 feet by 2½ feet and about 3 inches thick with the return end about 11 inches long. These are re-enforced with ¼" round bars the ends of which



stick out for the purpose of attachment to their neighbours. The inside of the wall is slabbed up with straight slabs of similar composition and means of attachment. The joints which are left wide are filled with cement. Internal partitions appear to be of single 3 inch slab construction. Until a floor has been constructed it is not clear on what the system depends for stability. As it is understood that not all is plain sailing between the construction and the city authorities results may be awaited with interest.

What is known as Roman Stone and is manufactured in Ontario has been employed in internal work at the Montreal Amateur Athletic Association's building in Peel Street in some small houses in Oxenden Avenue and is being used for dressings at the new Western Hospital buildings.

### THE PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

The Association met on December 19th to hear an address by Mr. F. Todd, landscape architect, on the subject of Civic Art. The lecturer naturally looked at civic art from his own professional point of view, pointing out the importance in regard to healthiness and beauty of good city parks and avenues. In most of the larger cities of the United States great efforts are made towards civic improvement in this respect, and architectural societies are generally found actively encouraging these efforts. A series of stereopticon slides were shown, most of them being plans of cities, illustrating actual or prospective park systems. Mr. Todd pointed out how the general endeavour was to obtain, both within the city and without, a well distributed system of garden spaces and parks, and to connect these together by wide streets or avenues generally known as park-ways, these park-ways being themselves punctuated where practicable by little open square or circular spaces at the principal intersections with the city streets. Amongst the plans shown on the screen were Milwaukee, Portland, Oregon, with its future park system as approved, Baltimore with very irregular park-ways connecting its park centres; Louisville, Ky., with its three great Shawnee, Cherokee and Iroquois parks with connecting boulevards; Buffalo, St. Louis, New York, Kansas City where circular intersections occur frequently on the park-ways; Stratford and Galt in Ontario, and Hartford, Conn., which has perhaps a larger proportion of open space per population than any other large city on the Continent.

The park system of Boston with which the lecturer had special personal connection came in for detailed description. The extent of irregular coast line and the windings of the Charles River give exceptional opportunities for varied and delightful parks and these have been taken advantage of to form what is probably the finest park system in America; not merely refreshing to the mind and eye but affording exceptional facilities for sea bathing, boating, playing grounds for children and gymnastic grounds for men. The spacious parks outside the city provide ample fresh air and holiday ground within access of the poorer classes of the community. A plan of Franklin Park was shown and attention called to the stately arrangement of the principal entrance and great formal concourse.

The new suburban Park at Winnipeg which Mr. Wood is at present occupied in laying out was next

noticed. It is intended to have at the entrance a large formal circle so laid out as to confine the attention of the visitor on first entering to the artificial beauties of this particular limited space. Beyond this it is not intended to interfere with the naturally flat character of the park which will simply retain such beauty as belongs to the plain. The formal circle at the entrance is introduced to emphasize the contrast between the wildness of nature and the carefully tended and ordered work of humanity as the trimly cared for garden expresses it.

### ARCHITECTURAL ACOUSTICS.

On the evening of the 13th of December, Prof. Cox, of McGill University, gave the Sketch Club of the P. Q.A.A. an instructive lecture on Architectural Acoustics, limiting himself to an exposition of the work of Prof. Sabine of Harvard University on the subject. Prof. Sabine, in endeavoring to account for and remedy the acoustic deficiencies of the lecture room of the Fogg Museum, was led into making a long series of practical experiments which proved fruitful in tangible results. He had determined generally that good hearing in a hall depended on three chief conditions: 1st, the loudness of the sound to be heard; 2nd, the absence of distortion of sounds occasioned by the manner in which they were reflected from wall and other surfaces; and, 3rd, on the duration of reverberation in the hall. From his investigations of this last point Prof. Sabine had arrived at definite results of great practical value, and, while now engaged in investigating the other points, this is the only one on which he has published his results. They are briefly these: Halls in which the audible reverberation of a sound is long continued are bad for hearing in, owing to the confusion of each fresh sound with the reverberating remnant of the previous one. Prolonged reverberation may readily be reduced by the introduction into the room of absorbent material.

Preliminary experiments brought out three remarkable facts in regard to the duration of audible reverberation in a room: 1st, that it has no relation to the position of the source from which the sound proceeds, being the same for all positions; 2nd, that it continues the same length of time in all parts of the room and is independent of the position of the auditor; and, 3rd, that it is also independent of the position in the room of the sound absorbing materials, provided their exposed area remains the same. These may thus be provided on ceiling, wall or floor as may be most suitable.

Professor Sabine has succeeded in measuring, with very considerable accuracy, the relative capacities for sound absorption of different substances. Experiments gave the following results, in which the loss of sound occasioned by one square yard of open window is taken as the standard:

Open window	1. 00	Plaster on tile	.025
Wood-lined walls	.061	Brick set in cement	.025
Plaster on wood lath	.034	Carpet	.54
do on wire lath	.033	½" hair felt in front of wall	.78

On the same basis the absorptive capacity of an audience of people was found to be .40 per person when seated and about .44 when standing. Women in this relation are found to be quite perceptibly more absorptive than men, in about the proportion of nine to eight.

Too long reverberation is the most frequent cause of bad acoustical quality in halls, and its duration may





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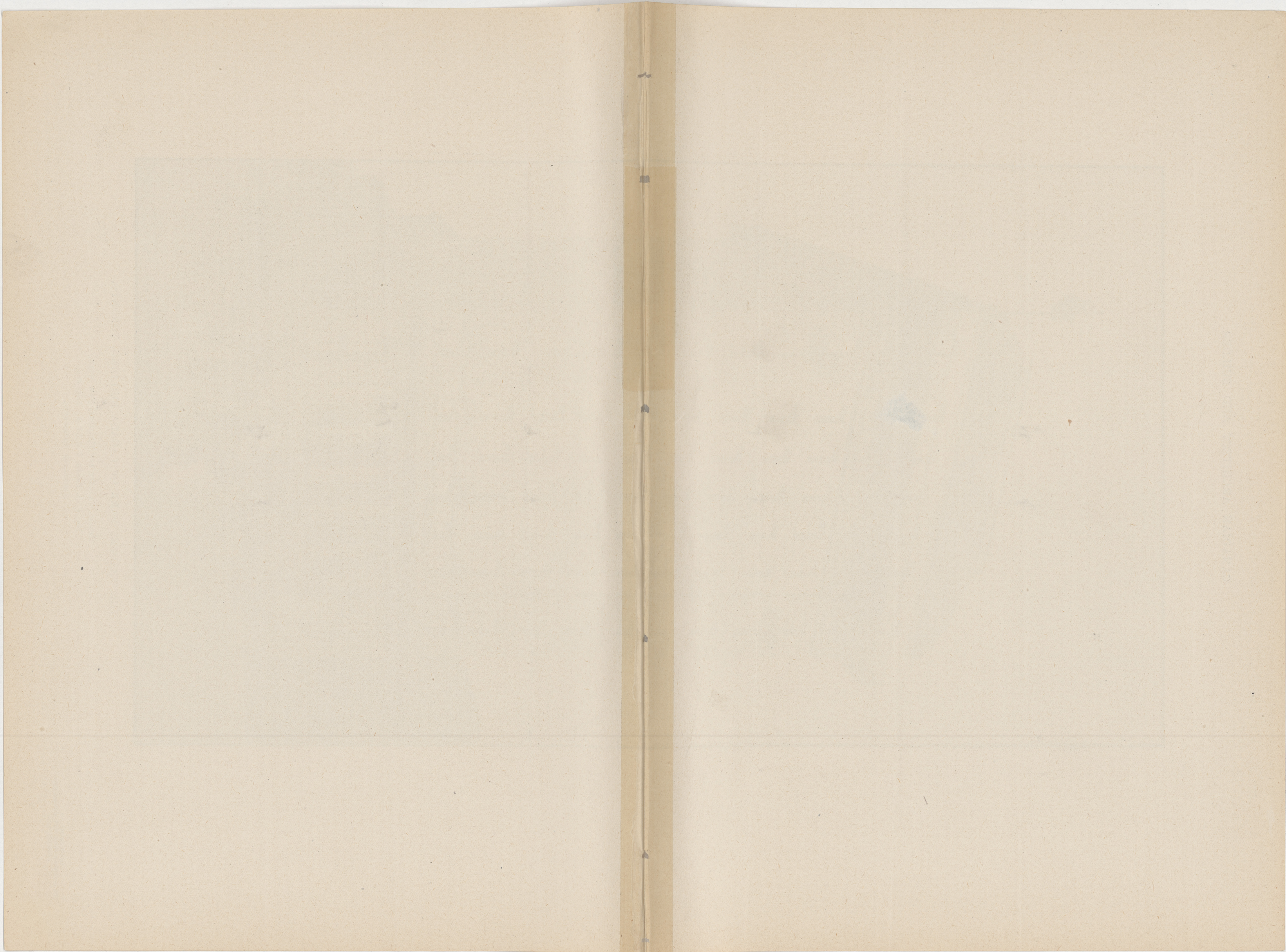




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be quite accurately determined beforehand by ascertaining the value of  $t$  in the equation of the hyperbola,  $(a + x)y = K$ , in which  $(a + x)$  represents the absorbing capacity of the exposed surfaces in the room together with that of the audience, whilst  $K$  is a constant proportional to the volume of the room. The duration of reverberation is thus inversely proportional to the absorbing capacity of the room and its contents. In the case of the Fogg Museum the duration of the sound was successfully reduced from a little over five seconds to about two seconds. For concert halls, a duration of about 2.30 seconds is desirable, to give fulness of tone, whilst three seconds would be too long. For lecture halls a shorter duration is desirable. The New Music Hall at Boston is designed with a duration of audible reverberation of 2.31 seconds.

In answer to questions asked at the end of his lecture, Prof. Cox said that, while Prof. Sabine had treated the question of the form and proportion of a room as of comparatively little importance, it should be remembered that his work so far dealt only with reverberation, and that his further investigations might illustrate the importance of these matters in certain cases. Prof. Cox's own personal experience, in speaking in rooms of different form, led him to believe that the form of the room, its proportions and the position of the speaker had much to do with good acoustics.

#### THE P.Q.A.A. SKETCH CLUB.

The Club held its annual general meeting on the 20th of December. The Council's report showed that in addition to three preliminary meetings and two visits held in the spring the Club had had ten weekly meetings in the winter session 1905 including the opening meeting, two lectures, two sketch design competition meetings, three book reviews, one general discussion and an exhibition of measured drawings. Besides the sketch design competitions, two monthly competitions in design had taken place and a prize for measured work awarded. The officers as elected were as follows: President, C. S. Burgess, A.R.I.B.A., Vice-pres., J. E. Fortin, secretaries Al. Wright and R. Charbouneau, treasurer, F. Peden.

Members of Council Thos. McLaren, A.R.I.B.A., Louis Labelle, W. Haldane and A. J. King.

Our ancestors had only a few materials, which they thoroughly understood and used in the most direct and unflinching manner. If they did not know the chemical and physical properties of these materials as well as we do, they had a practical insight into their working, which is of far more importance in design than the most profound analysis.

#### MOVING A BLOCK OF HOUSES.

The construction of an extension to the Thirteenth Regiment Armory, in Brooklyn, N. Y., required the removal of two rows of brick houses adjoining. It was at first proposed to pull them down, but they are being moved bodily to a site 300 feet away but round a corner. One block is already moved, the other is in process of preparation. The work does not differ from other removals except in the size of the mass and in its irregularity. The block moved is about 90 feet long, of buildings stone fronted but not substantially built, erected at different times, with thin double party walls and varying projections in the rear; one house had a three-storey bay window in front. To turn the corner the pushing jacks had to be operated with a greater number of strokes for each unit of distance from the pivotal end. When half way round the process was reversed; the forward wheeling end became the pivot and the former stationary end was pushed back. After reaching their required position the buildings were lowered 6 feet to place.

#### KNOT FOR TYING SASH CORDS.

A correspondent of *Carpentry and Building* writes: I enclose a sketch showing my method of tying a knot



in sash cord. The knot is shown tied loosely in order to clearly indicate the manner in which it is made, but in actual practice the knot is of course tied down against the weight, thereby causing the latter to hang plumb and true.

Men were not born equal, the axiom is false; but each is given a sphere wherein to work. The vessel that holds not water may still hold grain. It matters not so much what a man cannot do as what he can. In the struggle for world-supremacy, it is the fittest that survives and gains the mastery.

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In pointing out that billboard advertising has been largely relegated to liquors and nostrums, the Massachusetts conference for village betterment has touched the weakest spot of the feeble form of publicity. Always offensive to good taste, the billboard is daily growing more so by the loss of patronage of advertisers who are careful of the company they keep. When this process of elimination goes far enough, the billboard will become a medium for only the advertisers that cannot get a hearing through respectable channels. Then probably laws will be passed that will rid the public of this nuisance for good and all.—*The Western Architect.*

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## FIREPROOF TEST.

A singular test of fireproof construction was made some months ago in a New York skyscraper, sixteen stories high, housing a factory that uses paper, printing inks, machinery, and other inflammable material, with hundreds of employees. The architects were directed to spare no reasonable expense to make it fireproof, or, rather, what engineers term "fire-resisting," which to the laymen would often seem to be the same thing, says the Clay Record. The architects, on their part, undertook to deliver such a building at the lowest possible cost per cubic foot.

"How severe an actual test would you be willing to put on this building?" asked the owners of the architects when the structure was finished.

"Just as severe as you will authorize," was the reply. "Tests have never been made in a building of this class."

Prof. Ira H. Woolson, of the engineering department of Columbia University, was authorized to conduct a test, and a testing chamber of brick was built on one of the floors. This was a square hut, 6 x 8 feet, with the ceiling for its roof, designed to bring intense heat to bear upon the cinder concrete protecting the steel girders. The New York Fire Department sent a squad of firemen; instruments for measuring great degrees of heat were installed, and when all was

ready a fire of dry pine was started in the test chamber. In a few moments a conflagration of utmost fierceness was raging against the ceiling, and the instruments began to register extraordinary degrees of heat. One thousand degrees Fahrenheit, then 1,500 and 1,700, until finally, at the end of two hours and fifteen minutes, 2,112 degrees were recorded, which is higher than the fusing points of zinc, silver, copper and gold. Then the word was given and the firemen threw a sixty-pound stream of water into the chamber, reducing the heat in a few moments fully 1,500 degrees. The cinder concrete held under this test, while the girder which it protected was deflected less than a quarter of an inch. Virtually no fractures or impairment was found.—Improvement Bulletin.

The Architects' Directory and Specification Index for 1905-1906 contains a complete list of the architects of the United States and Canada, classified by States and Towns, indicating those who are members of the American Institute of Architects; also the names of the officers and locations of the different architectural associations in the United States. Also a complete list of the landscape and naval architects of the United States and Canada, indicating who are members of the American Society of Landscape Architects, also the Society of Naval Architects and Engineers. To which has been added a list of the building departments of the leading cities, with the names of the principal officers. Published annually. Seventh edition. New York: William T. Comstock. One 8vo.; vol.; red cloth, stamped in white. Price \$2 net. Wm. T. Comstock, Publisher, 23 Warren St., New York.

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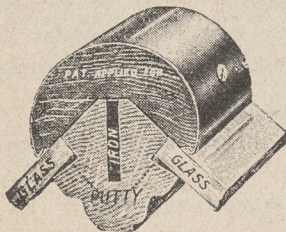
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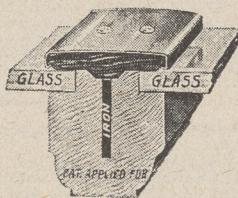
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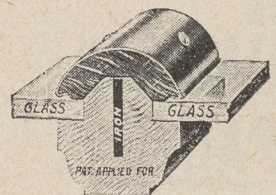


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### THE GOOD MANNERS OF A GOOD NEIGHBORHOOD.

The following case, as reported in *The Architect*, is interesting :

"Unseemly" is a word which is not usually applied to buildings. It is commonly employed to indicate acts. The equivalents given by Johnson are indecent, uncomely, unbecoming. But the word was enough to convince the Scottish courts that certain buildings were not fitted to be erected contiguous to a convent in Edinburgh. The nuns held under a deed which was made in 1863. It was guaranteed that on the adjoining land unseemly buildings were not to be erected. Application was recently made to erect two tenements of houses near the convent grounds. Permission was granted in the Dean of Guild Court, and the occupants of the convent applied to the courts for an interdict to prevent the erection of the buildings. It was argued on the other side that the buildings would be of a superior character. Lord Ardwall said the question he had to decide was whether the proposed build-

ings were unseemly within the meaning of the deed. His Lordship considered the phrase "unseemly building" must be construed with reference to the position and surroundings of the building, and (in a question of servitude) in view of the effect of its erection upon the dominant tenement. Now, the plaintiffs' house was a large and ornamental villa. It stood nearly in the centre of a garden, shrubbery and policies considerably larger than were generally found in connection with a villa. It had a bowling-green attached to it, and altogether might be described as a small *rus in urbe*. It appeared to him that to erect tenements such as proposed up to within ten yards or thirty feet of the pursuers' boundary-wall would have the effect of completely destroying the amenity of the plaintiffs' house and grounds. He was of opinion that having regard to the locality where they were to be erected, namely, a villa locality, and their proximity to the pursuers' handsome villa residence and grounds, they must be regarded as unseemly buildings within the meaning of the bond. Even if his Lordship had any

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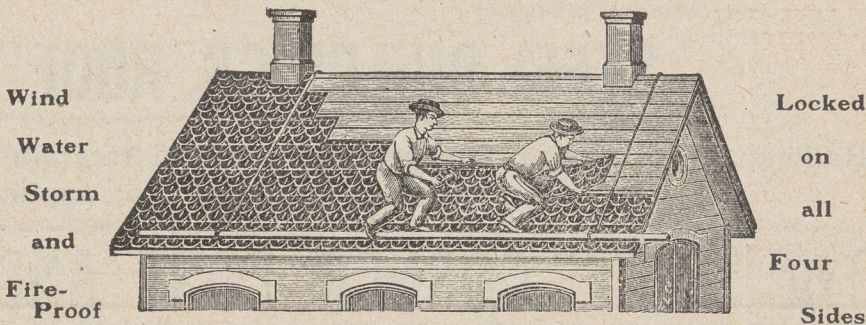
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serious doubt on the question as to the meaning and application of the word "unseemly" in the circumstances under consideration, he should hold *in dubio* that the word and the clause in which it occurred must be so interpreted as best to carry out the intention and meaning of the parties in entering into the agreement and the deeds following thereon. That intention undoubtedly was to preserve the amenity of the pursuers' residence, and that intention would be frustrated, were the tenements in question to be erected on the site proposed. Judgment was therefore given in favor of the nuns.

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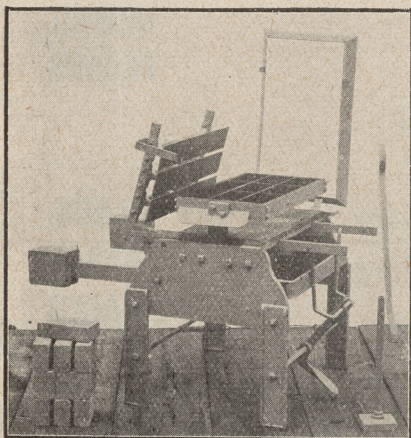
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## CANADIAN ROUGH CASTING.

Rough casting, or, as it is sometimes called, slap dashing, both of which are synonymous with the French *hourdage*, rough work, and *ravalement*, having a similar meaning, is a method of plastering the outside of buildings much used in the northern part of Canada because of its being durable, cheap and well adapted to keep out cold winds during the long winters in that section of the world. The methods of applying rough cast and the mixing thereof do not materially differ from the methods adopted in Northern Europe or even in the Northwestern States, but it is these minor differences, says a writer in an exchange, that make the Canadian rough casting superior, so far as durability is concerned, to much that is done in other parts of the world.

There are frame cottages near the city of Toronto and along the northern shores of Lake Ontario that were plastered and rough casted exteriorly over 40 years ago, and the mortar to-day is as good and sound as when first put on, and it looks as though it was good for many years yet if the timbers of the building it preserves remain good. Rough cast buildings are plentiful in every province in the Dominion from Halifax to Vancouver and from Lake Erie to Hudson Bay, and when built, and the rough cast properly mixed and properly applied, the result is always satisfactory. It is quite a common occurrence in Manitoba and the Northwest Territories in the winter to find the mercury frozen, yet this intensity of frost does not seem to affect the rough casting in the least, though it will chip bricks, contract and expand timber, and render stone as brittle as glass in many cases, and the effect on iron and steel is such as may prove dangerous if exposed to sudden and unexpected strain.

In preparing a frame or log building for rough casting care must be taken in putting down the foundation. A good stone or brick foundation is, of course, the best, but where rough casting is intended stone or brick foundations are seldom used because of their

cost, and the builder is compelled to use posts of wood. The posts are generally made of white cedar, which having a lasting quality of 35 or 40 years if sound when used. The posts are put in the ground from 3 to 5 feet, the deeper the better, as they should be deep enough in any case to prevent frost from forcing them upward. When a sufficient number of posts have been properly placed a line is struck on them the proper height from the ground and the tops leveled off. The sills are then placed—all joints being broken on top of posts—and the whole made level. These sills and all the other timber, scantlings and lumber should be well seasoned, if possible, for the greatest enemy to the plasterer is unseasoned timber; shrinkage of joists, posts and scantling not only breaks the bond of the mortar, but causes great cracks in corners and angles that no amount of pointing or patching can ever make good.

When the frame is up and the rafters on and well secured the whole of the outside should be covered with good, sound, common inch stock pine, hemlock, spruce or other suitable lumber, dressed to a thickness, if put on diagonally so much the better, but this is not absolutely necessary if the rough casting is to be of the best quality, as will appear hereafter.

When it can be done it is best to get all partitions set in place and lathed, the roof on and all necessary outside finish or grounds put in place and made ready to receive the lath. The carpenter must prepare his finish or grounds for finish to accommodate the extra lath, as the walls will be thickened accordingly.

For the cheaper sort of rough casting in one or two coats the following method of lathing is employed: Nail laths on the boarding—over paper or felt, if paper or felt is used—perpendicularly 16 inches from center to center if 4-foot laths are used, or 18 inches or 1 foot from center to center if 3-foot laths are used. The whole surface to be rough casted will require lathing this way. When done lath as is ordinarily done, with No. 1 pine lath, breaking joints every 15 inches. Put

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five nails in each lath, driving each nail home solid, coat over with mortar, well haired, and that has been made four or more days; smooth and straighten as well as possible with a darby. When done and while yet soft the rough cast is thrown on it with such force as to drive the pebbles or small stones deep into it. The mixture or dash, as it is called, is composed of fine gravel, clean washed from all earthly particles and mixed with pure lime and water till the whole is of a semifluid consistency. This is mixed in a shallow tub or pail and is thrown upon the plastered wall with a wooden float about 5 or 6 inches long and as many wide, made of  $\frac{1}{2}$ -inch pine and fitted with a wooden handle. While with this tool the plasterer throws on the rough cast with his right hand, he holds in his left a common whitewash brush, which he dips into the rough cast and then brushes over the mortar and rough cast, which gives them, when finished, a regular, uniform color and appearance.

For this sort of work the following proportions will answer: To one barrel of prepared gravel use a quarter of a barrel of putty; mix well before using. This may be colored to suit the taste by using the proper materials, as given further on. It must be understood that the foregoing is the cheapest sort of rough casting and is not recommended where more durable but more expensive work is required.

The best mode of doing this work as practiced in the lake district of Ontario is nearly as follows: Have the frame of building prepared as indicated in the foregoing, with partitions all put in and well braced throughout and well secured. Lath diagonally with No. 1 pine lath, keeping  $1\frac{1}{2}$  inches space between the lath. Nail each lath with five nails, and break joints every 18 inches. Over this lath again diagonally in the opposite direction, keeping the same space between the lath and the breaking joints as before. Careful and solid nailing is required for this layer of lathing, as the

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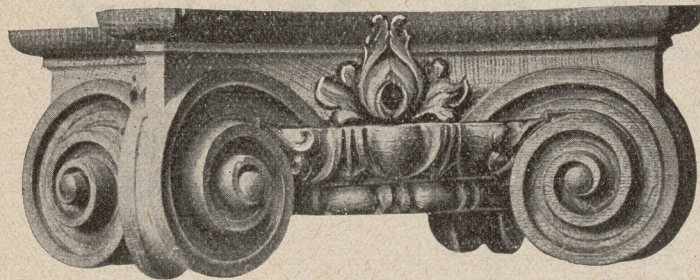
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permanency of the work depends to some extent on this portion of it being honestly done. The mortar used for the first coat should have a goodly supply of cow's hair mixed in with it, and should be made at least four days before using. The operator must see to it that the mortar be well pressed into the key or interstices of the lathing to make it hold good. The face of the work must be well scratched to form a key for the second coat, which must not be put on before the first or scratch coat is dry. The mortar for the second coat is made in the same way as that required for the first coat, and is applied in a similar manner, with the exception that the scratch coat must be well damped before the second coat is put on, in order to keep the second coat moist and soft until the dash or rough cast is thrown on. The rough casting is done exactly in the same manner as described for the cheaper sort of rough cast work.

A building finished in this manner, if the work is well done, possesses many advantages over the ordinary wood covered structure. It is much warmer, being almost air tight so far as the walls are concerned. It is safer, as fire will not eat its way through work of that kind for a long time. It is cleaner, as it will not prove such a harbor for insects. It may be made as handsome as desired, for before the rough cast is dashed it may be laid off in panels of any shape by having strips of battens tacked over the soft mortar, which may be removed after the rough casting is done and the coloring is finished. It is much superior to the so-called brick veneered house, as it is warmer, more exempt from fire and cheaper.

For 100 yards of rough casting in the manner described the following quantities will be required: 1800 laths, 12 bushels of lime,  $1\frac{1}{2}$  barrels best cow hair,  $1\frac{3}{4}$  yards of sand,  $\frac{3}{4}$  yards of prepared gravel and 16 pounds of hot cut lath nails,  $1\frac{1}{4}$  inches long. The gravel should be sifted through a  $\frac{1}{2}$ -inch mesh screen, and should be washed before mixing with the lime putty.—*Carpentry and Building.*

### THE UNION OATH.

The following is quoted by *The Western Architect and Builder* from the Charlotte (N.C.) Observer.

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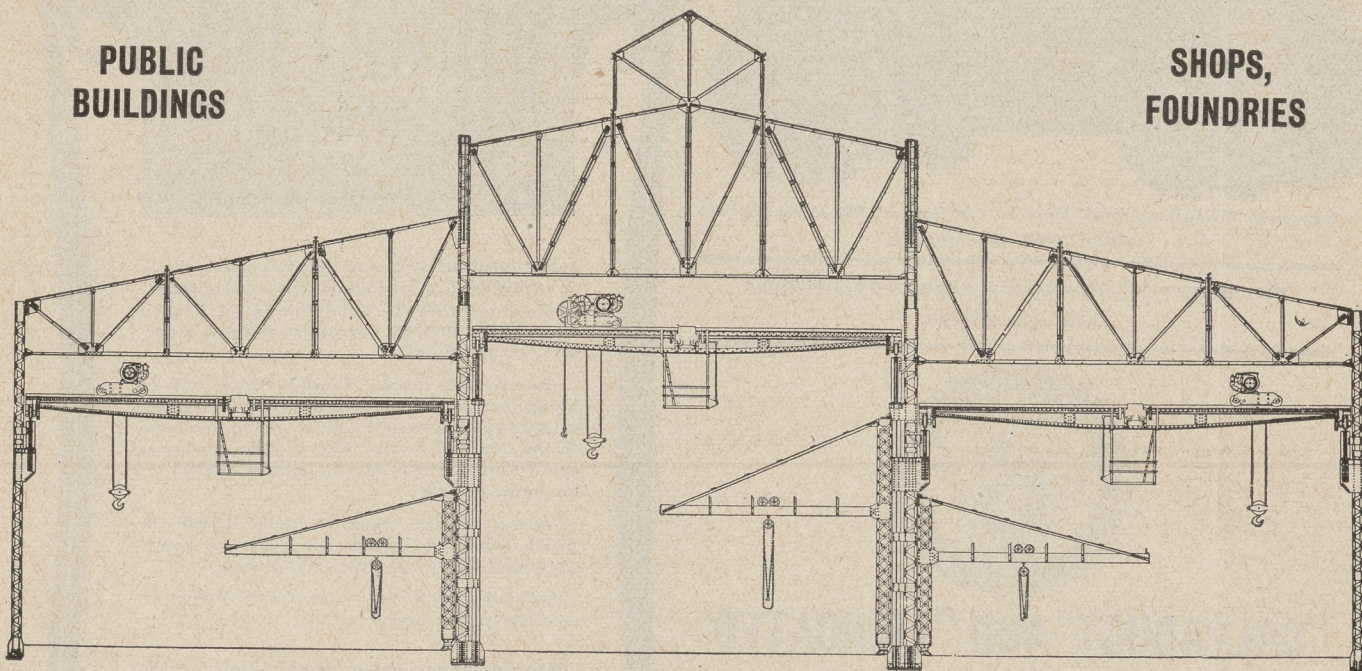
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We put in capital letters (our exchange says) the sentence to which we would direct special attention. It is to be seen that the oath puts fidelity to the union above every obligation, human or divine. It is no wonder that a Catholic priest, Bishop or Archbishop, in the Northwest should have, a year or two ago, read it to his congregation and announced that no person taking it could, in his parish or diocese, have the benefit of the communion of the Catholic Church.

How any rational human being could ever bring himself to take so fearful an oath, passes comprehension. Those who have done so and by doing so sworn away their allegiance to all else save "the union," owe it to themselves, their families and to society to repudiate and throw it off. They did not know what it meant when they took it.

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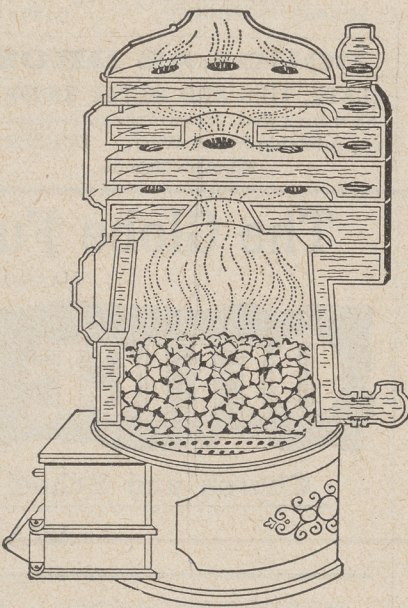
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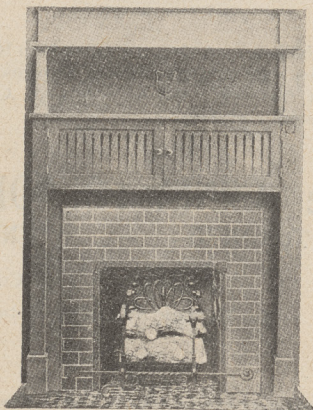
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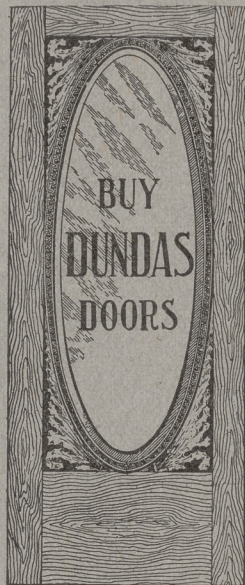
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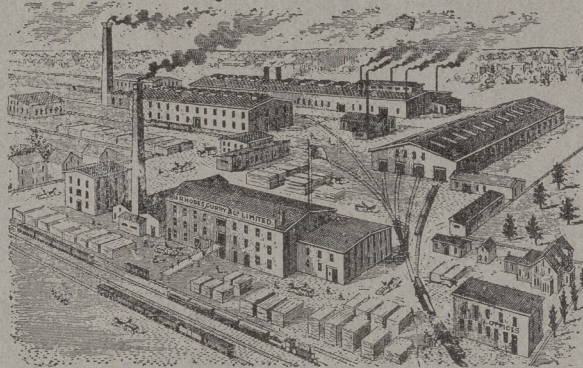
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